Science Class 8 (SNC)

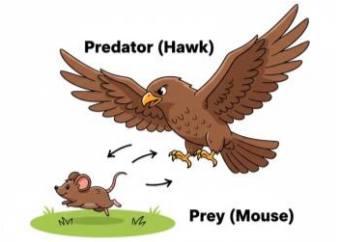
Solved All Exercises

1. What are Ecological pyramid?

Ans. The graphical representation of different feeding level in an ecosystem is called Ecological pyramid.

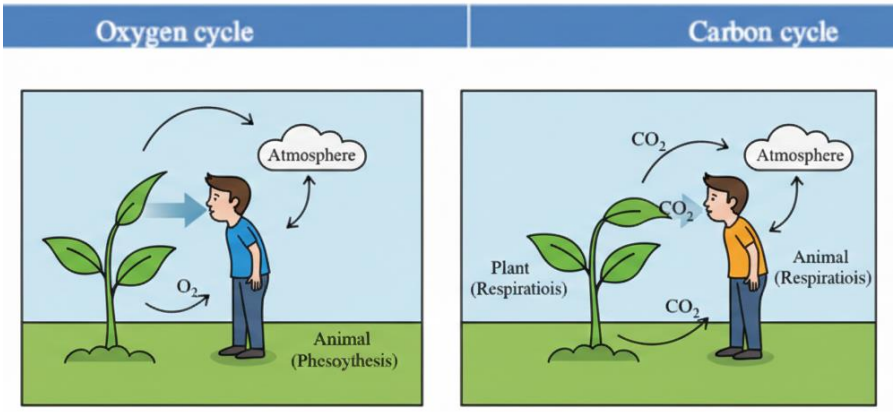
2. What is predation?

Ans. Predation is a relationship between organisms in which one organism actively hunt the other organisms for food. This relationship is called predation.



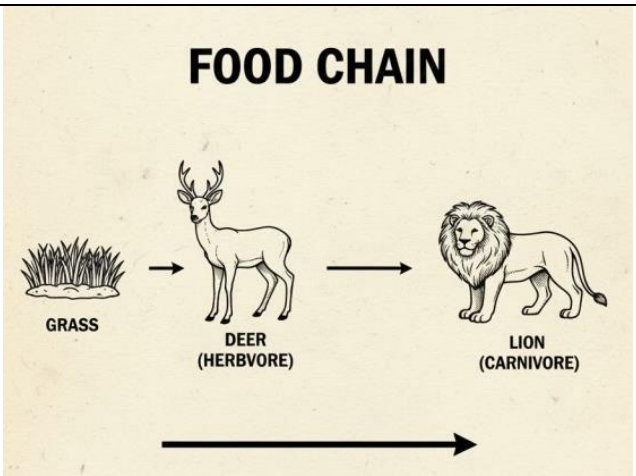
3. Differentiate between. Carbon and oxygen cycle.

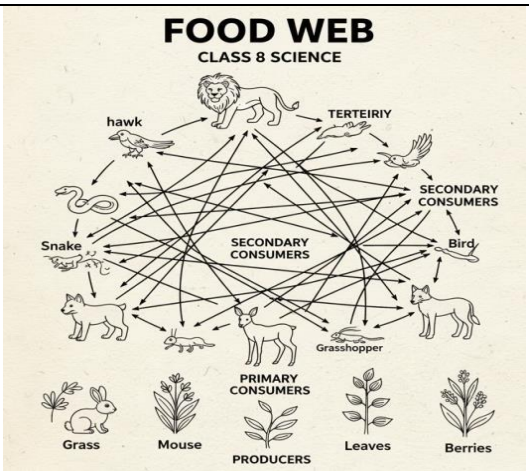
Oxygen cycle	Carbon cycle
The movement of oxygen between organisms and atmosphere is called oxygen cycle.	The movement of carbon dioxide between organisms and atmosphere is called carbon cycle.
Oxygen present in atmosphere in the form of O2.	Carbon present in atmosphere in the form of CO2.
Animal take oxygen from atmosphere for respiration.	Plants take carbon dioxide from atmosphere for photosynthesis.
Animal release Carbon dioxide into atmosphere.	Plants release oxygen into atmosphere.



Part 2. Differentiate between Food chain and food web.

Food chain	Food web
Relationship between different feeding level in ecosystem is called food chain.	Combination of two or more than two food chain is called food web.
In food chain one organism is feed by only one organism.	In food web one organism is eaten by more than one organism.
e.g. grasshopper eat grass.	e.g. Grasshopper and mouse both eat grass.

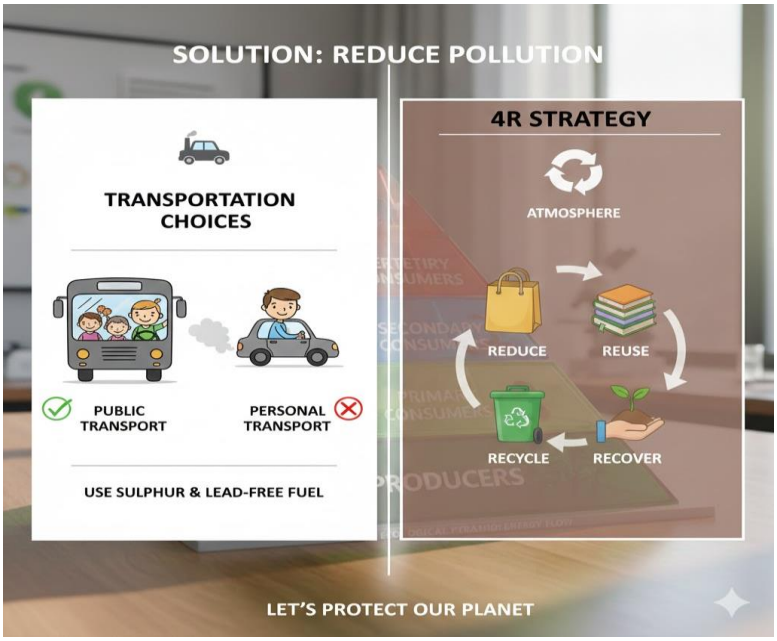




4. Write any one solution of environmental problems.

Ans. We can solve the environmental problem by reducing pollution.

We can reduce pollution by using public transport rather than personal transport. Sulphur and lead free oil should be used. By applying 4R strategies.

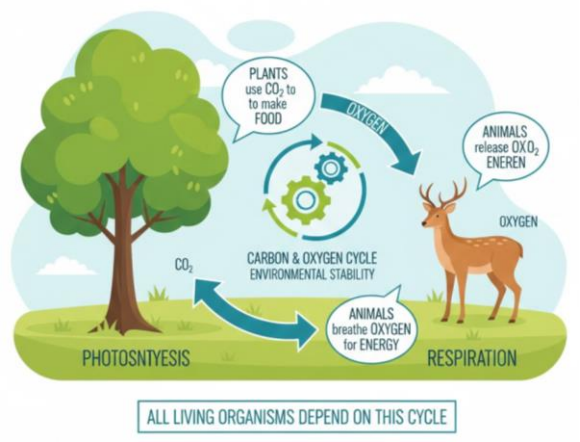


5. Name some of the factors which can cause ecological imbalance.
Ans. There are some factors which cause ecological imbalance.

- Overhunting
- Migration
- Over Population

1. How carbon and oxygen cycle are helpful for environment.
Ans. Carbon and oxygen cycle are of very importance.

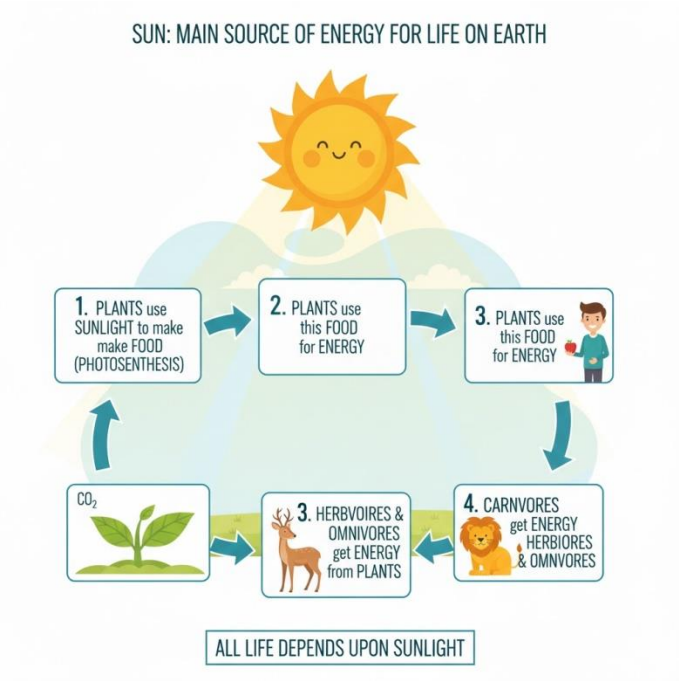
- Due to carbon cycle plant can photosynthesize and prepare their food.
- Due to oxygen cycle animal take oxygen for respiration to get energy from food.
- Due to respiration animal release Carbon dioxide into atmosphere.
- Due to photosynthesis plant release oxygen into atmosphere.
- All living organisms depends upon this cycle in many ways.
- Due to carbon and oxygen cycle environment is stabilized.



2. Is the sun main source of energy for life on earth. how?

Ans. Sun is the main source of energy for life on earth in different ways.

- Sunlight is used by plants.
- Plants use sunlight to prepare food.
- Plants use this food.
- Other living organisms (herbivore and omnivore) get food from these plants.
- Carnivore get food from these herbivore and omnivore.
- In this way all life depends upon sunlight.

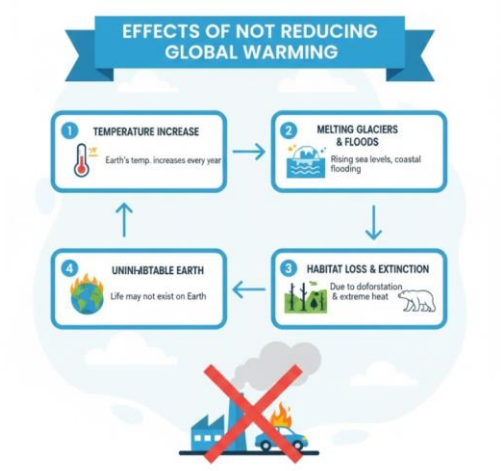

SUN: MAIN SOURCE OF ENERGY FOR LIFE ON EARTH
1. PLANTS use SUNLIGHT to make make FOOD (PHOTOSENTHESIS)
2. PLANTS use this FOOD for ENERGY
3. PLANTS use this FOOD for ENERGY
CO_2
3. HERBVOIRES & OMNIVORES get ENERGY from PLANTS
4. CARNVORES get ENERGY HERBIORES & OMNVORES
ALL LIFE DEPENDS UPON SUNLIGHT

3. What would be the effect of over hunting?
Ans. Overhunting means killing or capturing the wild organism for economic or own interests. Due to over hunting many problems are creating.

- Species are endangered to be extinct.
- Food chain disturb due to overhunting.
- Wildlife is decreasing day by day.
- Ecological imbalance is created in the environment.

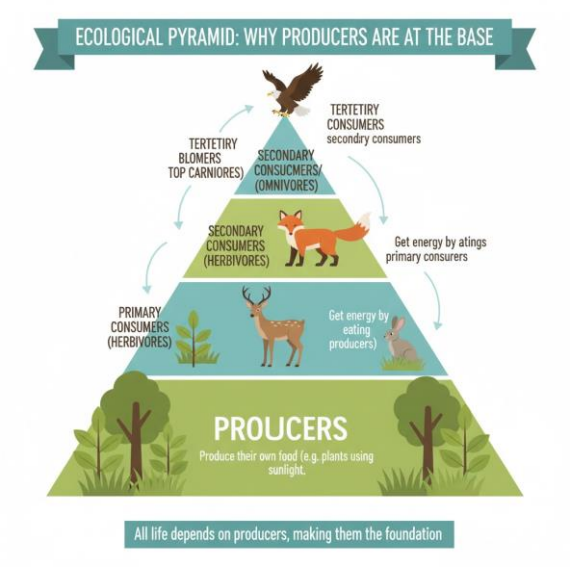
1. What would happen if we do not reduce global warming?
Ans. Day by day increase of temperature of the earth due to green house effect is called global warming. If we don't reduce global warming many problems can be created in earth atmosphere.

- Due to global warming temperature of earth increase every year 0.05∘C.
- After few years the temperature of earth will increase so much that life may not exist on earth.
- Due to high temperature ice glaciers will melt continuously which will cause flood in lower areas.
- Due to deforestation loss of habitat occur which cause extinction of species


EFFECTS OF NOT REDUCING GLOBAL WARMING
1 TEMPERATURE INCREASE
Earth's temp. increases every year
2 MELTING GLACIERS & FLOODS
Rising sea levels, coastal flooding
3 HABITAT LOSS & EXTINCTION
Due to doforstation & extreme heat
4 UNINHABTABLE EARTH
Life may not exist on Earth

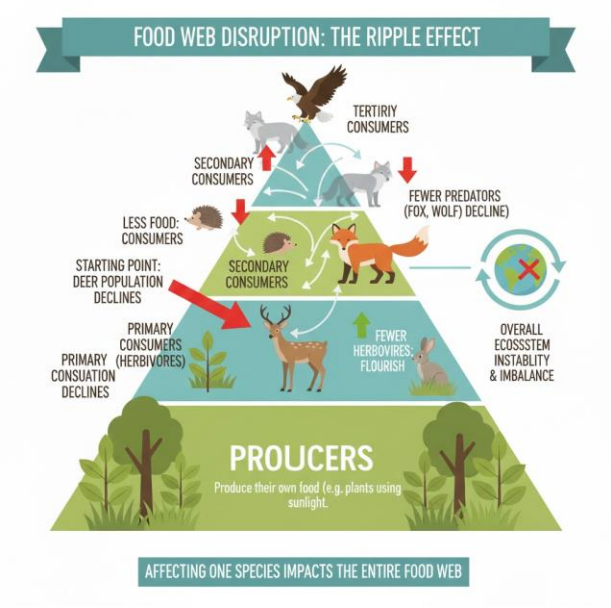
2. Why do the producers occupy the base of ecological pyramid?

Ans. Producer present at the base of ecological pyramid because producers are only living organisms that prepare their own food. Remaining all organisms depends upon one another for food. Due to this reason producer occupy the base of ecological pyramid.


ECOLOGICAL PYRAMID: WHY PRODUCERS ARE AT THE BASE
TERTETIRY CONSUMERS secondry consumers
TERTETIRY BLOMERS TOP CARNIORES)
SECONDARY CONSUCMERS/ (OMNIVORES)
SECONDARY CONSUMERS (HERBIVORES)
Get energy by atings primary consurers
PRIMARY CONSUMERS (HERBIVORES)
Get energy by eating producers)
PROUCERS
Produce their own food (e.g. plants using sunlight.
All life depends on producers, making them the foundation

3. Hypothesize what would happen if the population of one specie affected.

Ans. If the population of one species is affected It will affect the many other species of living organisms which depend upon them for food and on which species whose population is affected are depending.


FOOD WEB DISRUPTION: THE RIPPLE EFFECT
TERTIRIY CONSUMERS
SECONDARY CONSUMERS
FEWER PREDATORS (FOX, WOLF) DECLINE)
LESS FOOD: CONSUMERS
STARTING POINT: DEER POPULATION DECLINES
SECONDARY CONSUMERS
PRIMARY CONSUMERS (HERBIVORES)
PRIMARY CONSUATION DECLINES
FEWER HERBOVIRES: FLOURISH
OVERALL ECOSSSTEM INSTABLITY & IMBALANCE
PROUCERS
Produce their own food (e.g. plants using sunlight.
AFFECTING ONE SPECIES IMPACTS THE ENTIRE FOOD WEB

Write down the function of midbrain, hypothalamus and spinal cord.
Ans. Midbrain:

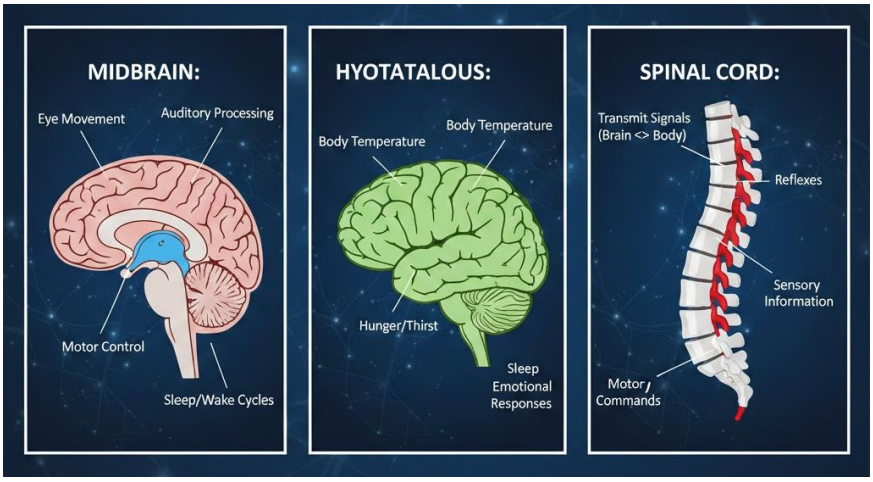
- It receives sensory information and sends them to appropriate part of brain.
- It controls sleep wake cycle, vision and hearing.

Hypothalamus:

- It controls body temperature, hunger and thirst.

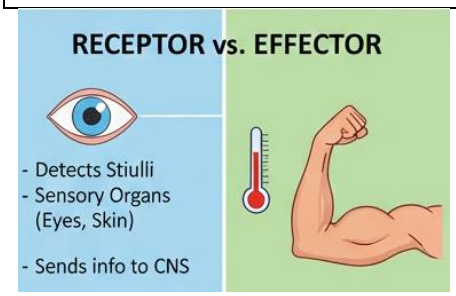
Spinal cord:

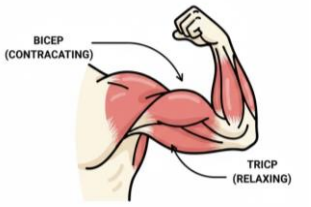
- It links brain with different parts of body.
- It controls involuntary actions.
- It performs immediate action.



2. Differentiate between
(a). receptors and effectors.

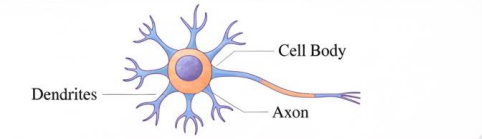
Receptors	Effectors
Receptors detect any stimulus of environment to produce nerve impulse.	Effectors convert nerve impulse into action.
Receptors are sense organ which receive stimulus.	Effectors are glands or muscles where response occur.
Receptors send information to brain or spinal cord.	Effectors show response for information coming from brain.
e.g. skin, eye, ear	e.g. muscle, glands.

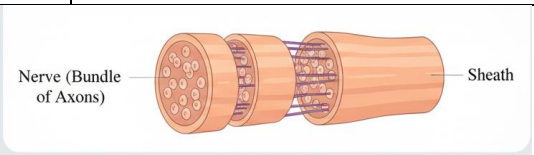




b) Neuron and nerve

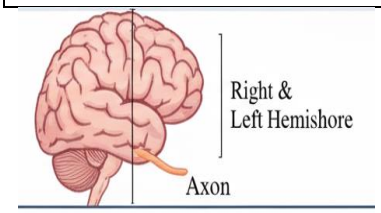
Neuron	Nerve
Neuron is Basic structure and functional unit of nervous system.	Nerve is a bundle of axons enclosed in common sheath.
It consists of cell body, dendrites and axon.	It consists of bundle of axons.

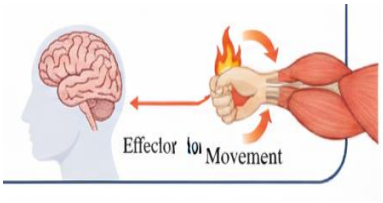




Sensory neurons and motor neurons.

Sensory neurons	Motor neurons
Neurons which send message towards the brain are called sensory neurons.	Neurons which send message towards effectors are called motor neurons.
It receives information from sensory organ.	It receives information from brain.
Sensory neurons are related with receptors.	Motor neurons are related with effectors.





Cerebrum and cerebellum.

Cerebrum	Cerebellum
It is a largest part of forebrain.	It is a part of hind brain.
It has two parts. Right hemisphere and left hemisphere.	It is a single part.
It controls many functions like speech, decision making, comprehension, creativity etc.	It controls accurate body movement.

3. Write a note on central nervous system.

Ans. The system in our body which coordinate all the function of a body is called nervous system. It consists of two parts:

Central nervous system

Peripheral nervous system.

Central nervous system: It consists of brain and spinal cord.

Brain: It is enclosed by a bony skull called cranium. It consists of three parts.

Forebrain: It is the large part of brain. It consists of three parts: Cerebrum, Thalamus, Hypothalamus.

Cerebrum: Present at the top most position. Divided into two parts: Right hemisphere (controls left body parts) and Left hemisphere (controls right body parts). Controls functions like speech, decision making, comprehension, creativity, artistic, musical skills etc.

Thalamus: Controls sensory function like hearing, vision etc.

Hypothalamus: It is the last part of forebrain. It controls body temperature, thirst and hunger.

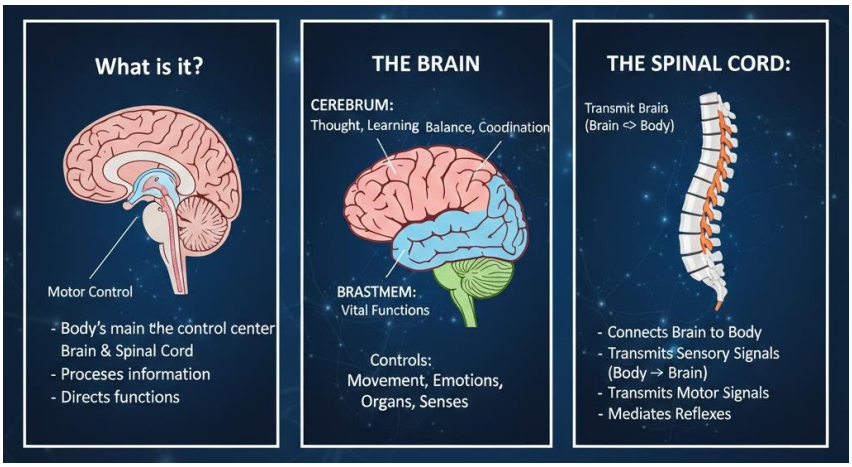
Midbrain: Present below the cerebrum. Receives information from sense organ and sends it to appropriate part of brain. Controls functions like sleep wake cycle, alertness and vision.

Hind brain: It consists of three parts: Cerebellum, Pons, Medulla oblongata.

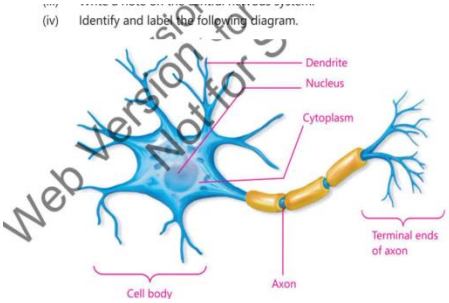
Cerebellum: Controls body balance and perform accurate body movement.

Pons: Oval shaped part of hind brain. Controls swallowing, equilibrium and taste.

Medulla oblongata: Connects spinal cord with brain. Controls involuntary actions like heartbeat, breathing, digestion. It is the only brain part which is working all the time till death of an organism.



(iv) Identify and label the following diagram.
(Diagram of a Neuron is shown with parts: Cell body, Dendrite, Nucleus, Cytoplasm, Axon, Terminal ends of axon.)

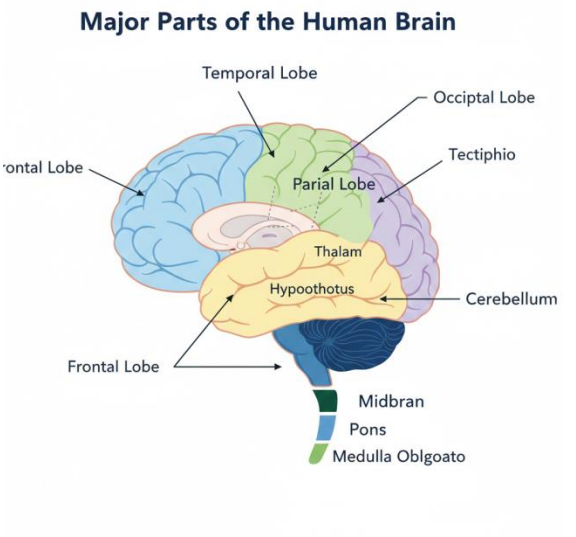


3. Constructed response questions

(i) The table below shows the list of your daily activities.

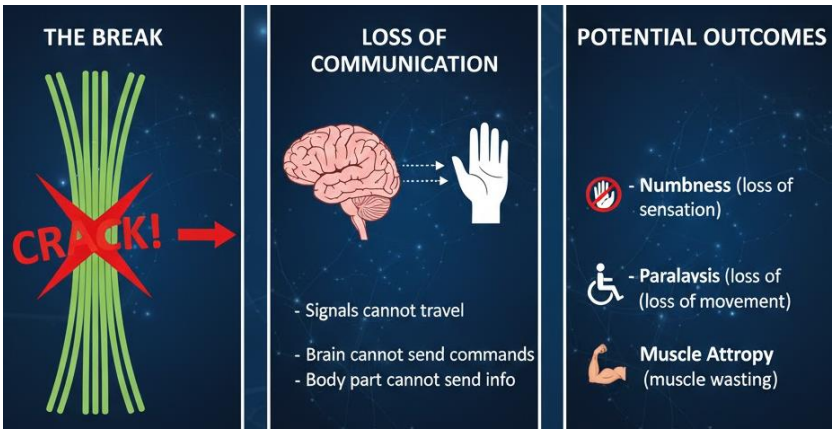
Write the name of brain (forebrain, midbrain or hindbrain) which is controlling this activity.

Sr. No.	Function	Brain part
1	Sleeping	Pons (hind brain)
2	Brushing your teeth	Frontal lobe (forebrain)
3	Taking breakfast	Hypothalamus (forebrain)
4	Balancing your body	Cerebellum (hind brain)



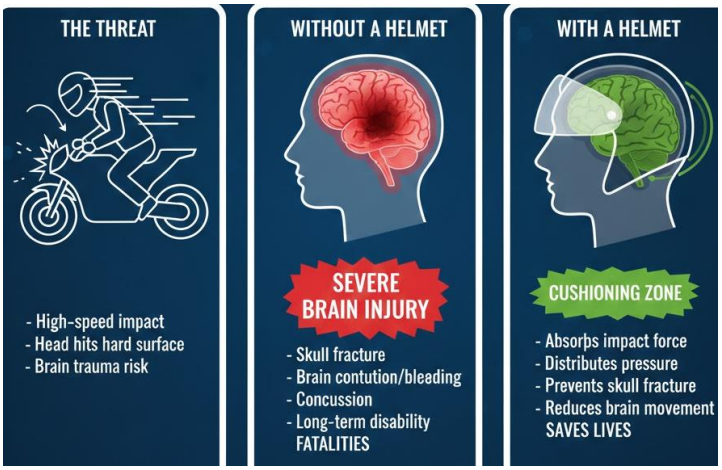
2. Predict what would happen if our nerve connection break.

Ans. Our nerve connections coordinate all body functions. If this connection is cut by any process our body cannot work properly because sensory organ will not send message to brain and brain will not send message to effectors to show response. If our connection of nerve is cut, it may take time to heal and then it can perform its function properly.



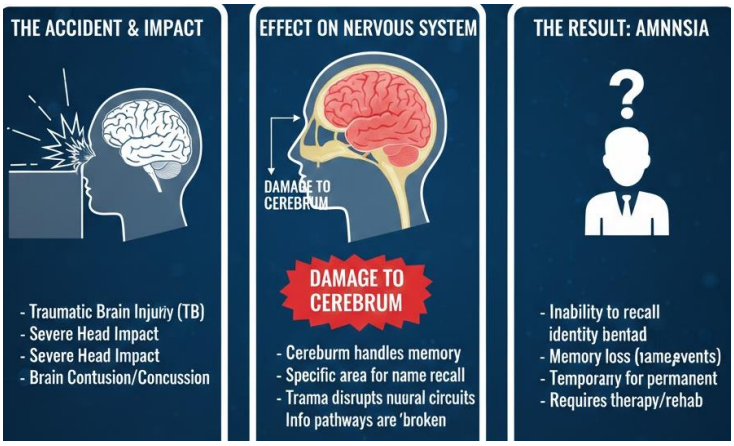
1. Why a motorcycle driver is advised to wear helmet?

Ans. Motorcycle driver is advised to wear helmet to reduce risk of head injury in case of any accident. A research showed that 69% chances of head injury can be reduced in case of wearing helmet. Head injury may cause brain damage or any brain part loss.



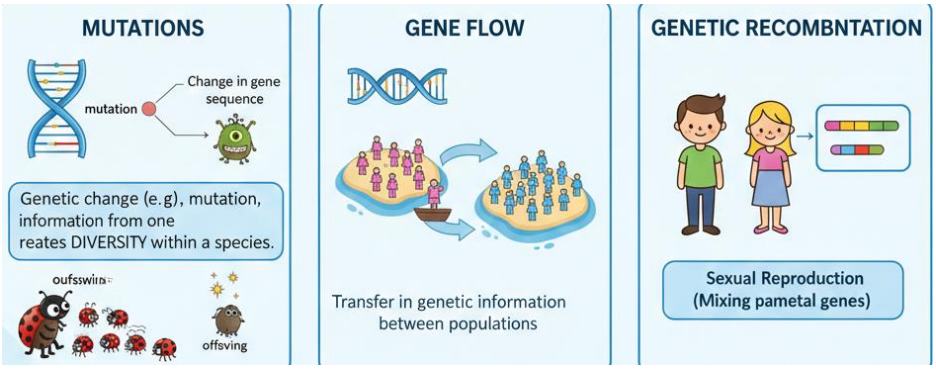
2. A person met an accident in a car. When he was brought to hospital he didn't know his name even. What should be the reason of this.

Ans. When a person met an accident. It may result into head injury. Head injury may cause any brain part damage. If a frontal lobe of brain is damaged he will lose his memory for sometime and then he will not know even his name or any other information. Because when a brain part is damaged a nerve connection is cut for sometime which may cause loss of memory

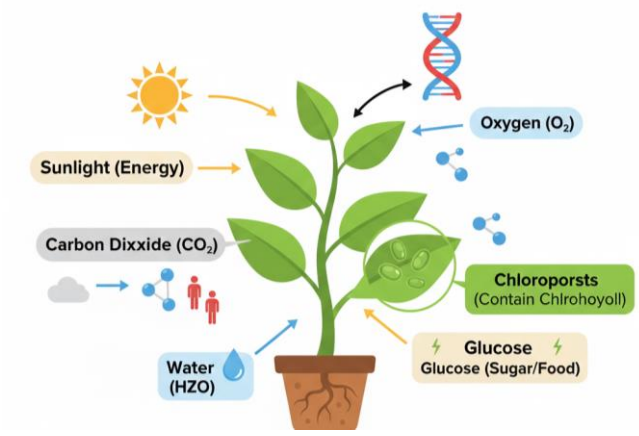


What is the primary source of genetic variation?
Answer. The primary sources of genetic variation are given below.

- Mutations. (Change in sequence of gene)
- Gene flow (transfer of genetic information from one population to another)
- Genetic combination (sexual reproduction)



ii- Plants are adapted to their environment give example
Answer. Every organism adapt themselves according to their environment. Plants also adapt their environment in different ways. Cactus is a plant of desert. It has adaptation to store water. Its leaves are modified to spines and have thick cuticle on the surface to reduce loss of water. It has shallow roots that spread close to the surface to quickly absorb rain water.



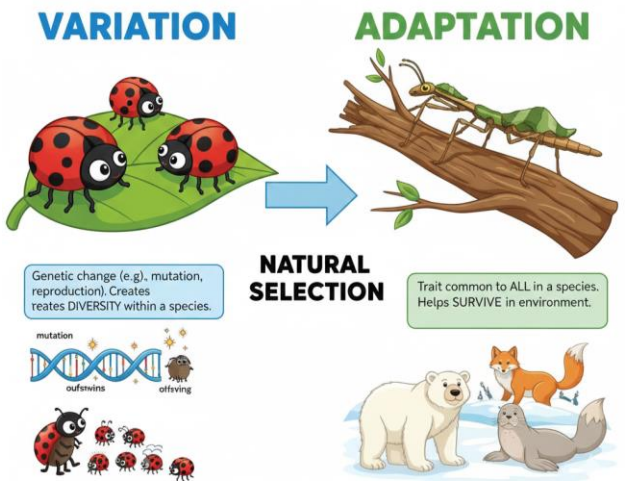
iii- What is difference between variation and adaptation?
Ans. Adaptation are physical and behavioral traits that make an organism better suited to its environment.

Adaptation is a trait that all the organisms of a species have.

The trait that allows an organism to survive in its environment.

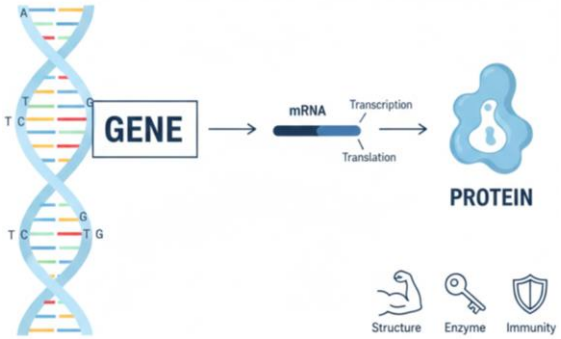
Variation is a genetic change which causes an organism to survive in environment.

Variation comes from random mutation, sexual reproduction or gene flow.



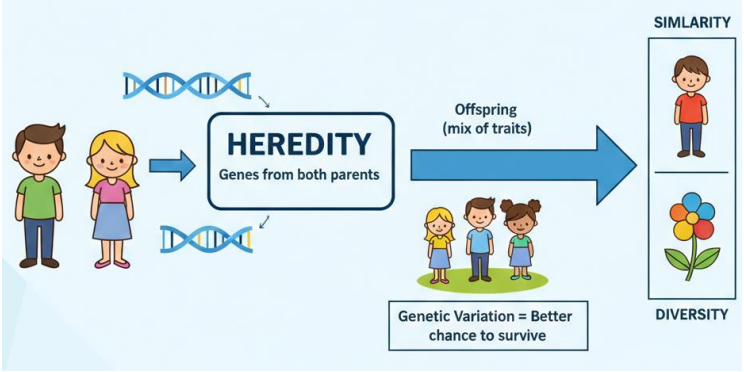
iv- What is a gene?

Ans. The basic structural and functional unit of heredity is called gene. It acts as an instruction to make molecule called protein for specific purpose.



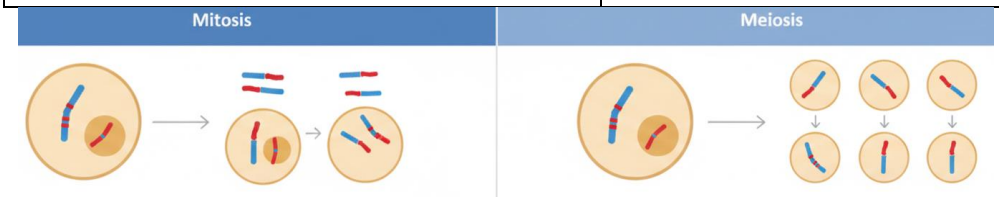
v- Define heredity. Describe its importance in transferring of characteristics from parents to offspring.

Ans. Transmission of characteristics from parents to offspring is called heredity. The process of heredity is a reason behind similarity in parents and offspring characters. Offspring characteristics comes from both parents so it resembles mostly with his parents. Some genetic variation also occur due to which offspring can survive in their environment better than their parents.



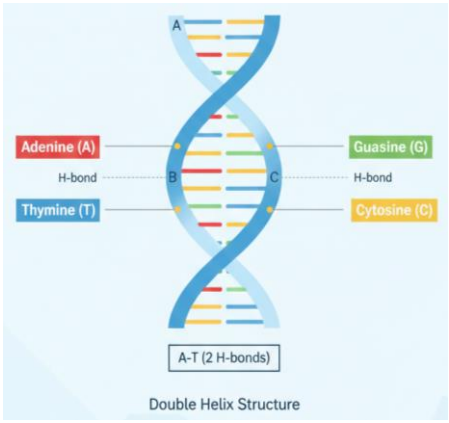
vi- Differentiate between mitosis and meiosis.

Mitosis	Meiosis
The type of cell division in which parent cell divide into two daughter cell.	The type of cell division in which parent cell divide into four daughters cell.
The number of chromosomes remain same in parent and daughter cell.	The number of chromosomes reduce to half in daughter cell.
Mitosis occur in somatic cells.	Meiosis occur in germ cell.



viii- What is the structure of DNA?

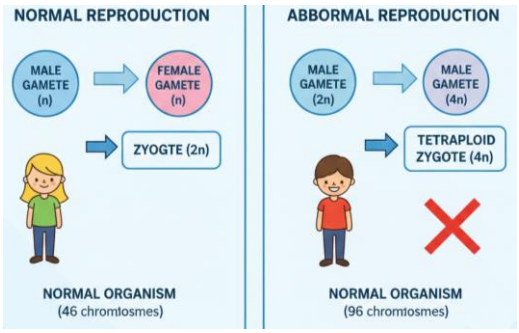
Ans. DNA is a hereditary material. It is a double helical structure containing four nucleotides: Adenine (A), Thymine (T), Cytosine (C), Guanine (G). Adenine makes hydrogen bond with Thymine. And Cytosine makes hydrogen bond with Guanine



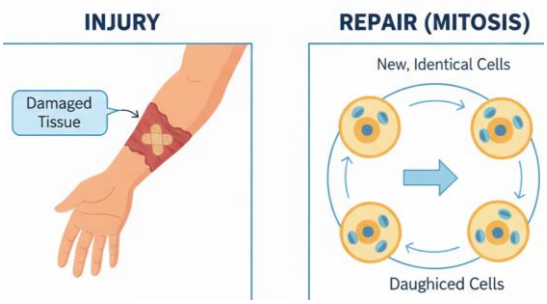
2. Constructed response questions.

i- Gametes are haploid cells. What do you think would happen if the gametes forming a zygote are diploid?

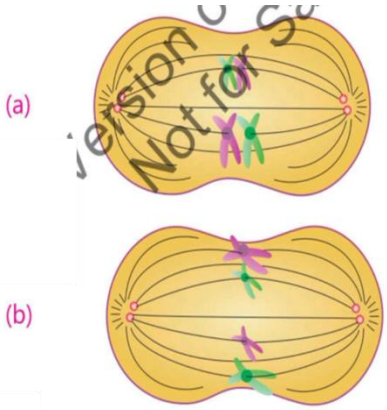
Ans. In sexual reproduction gametes are haploid cell. When male and female gametes fuse with each other they form a diploid zygote. But If diploid gametes fuse with each other they will form a tetraploid (4n) zygote and the resulting organism will be abnormal. In case of human having 92 chromosomes.



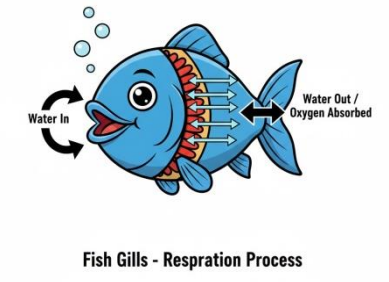
ii- An injury on a person body needs more and more cells for the repair of his body. What type of cell division you think will provide more and more cells for his repair?
Ans. Whenever a body part of a person gets injury. It needs more and more cells division to compensate that region. In this case mitosis cell division occur to produce more and more cells.



(iii) Which of the following Figures represent a phase of mitosis and the other a phase of meiosis?
(a) (Figure showing chromosomes separating, resulting in half the number)
Ans. It is a meiosis process because figure shows that during division daughter cell will contain half no. of chromosomes as compared to parent cell.
(b) (Figure showing chromosomes separating, resulting in the same number)
Ans. It is a mitosis process because figure shows that no. of chromosomes will remain the same as compared to parent cell.



i- How are fish adapted to their environment.
Ans. Fish adopt themselves in their environment in many ways.



Fish Gills - Respration Process

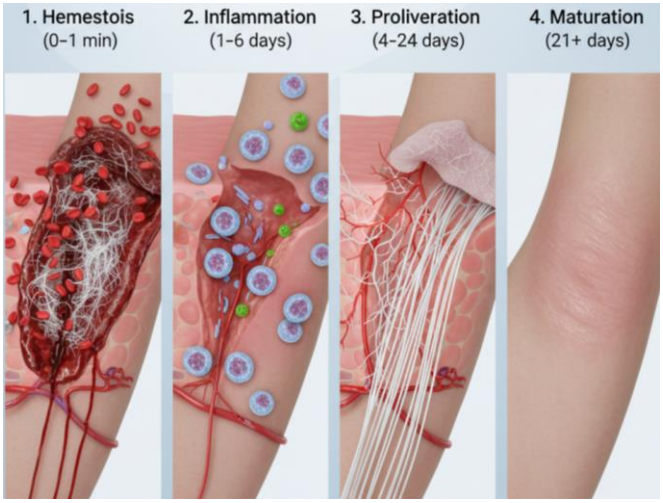
Fish has streamline body to move in water easily.

Most fish have several fins for swimming.

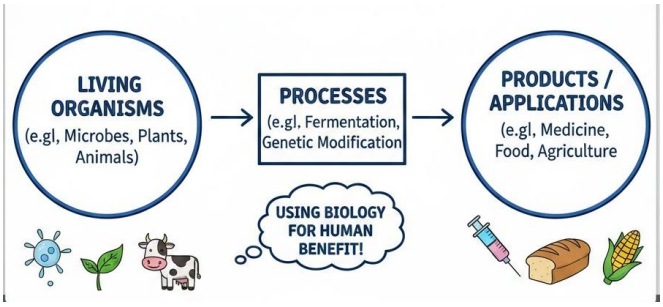
Fish have gills that allow them to breath oxygen in water.

Most fish have color pattern that allow them to blend in with their environment.

ii- When you get a cut on your hand. How it get healed?
Ans. When we get a cut on our hand it gets healed because the region of cut has information from brain to increase cell division. So due to mitosis cell division hand cut gets healed.

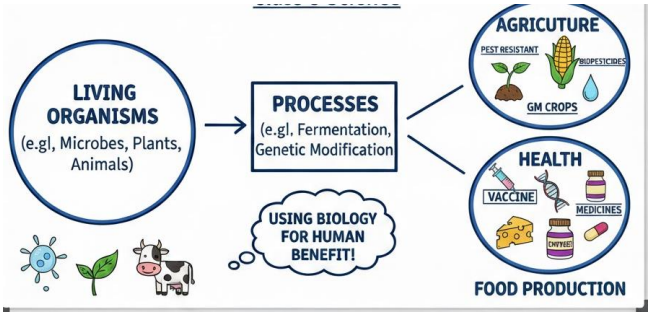


2. Write short answers.
(i) What is biotechnology?
Answer: Biotechnology is the use of living cells and organisms in products and processes that can improve the quality of life.



(ii) Name at least two life saving products of biotechnology.
Answer: Two life saving products of biotechnologies are:
i. **Insulin:** It is useful for diabetes.
ii. **Vaccine:** It is used against many infectious disease.

iii) Write the application of biotechnology in (a) Agriculture (b) health (c) food production



(a) Agriculture

Biotechnology has played a revolutionary role in improving our agriculture and production of high yields of crops. Herbicides and pesticides are used to eliminate the crop enemies. Such chemicals also cause damage to the crop plants. Using biotechnology scientists insert weed resistance and pest resistance genes into the plants.

Cultivation of such genetically modified crops improves the yields of the crops and makes them safe for human use. Biotechnology techniques are used to increase the nutrients in different crops to fulfill the need of human being. Biotechnology has worked out to increase the amount of iron in rice to meet the deficiency of iron in human.

(b) Health

Biotechnology has played a revolutionary role in the field of health. Biotechnology has played a role in diagnosis of disease and then curing the disease by making medicine using biotechnology techniques. First of all the root cause of disease are find. And then medicine are prepared by using biotechnology techniques and then using these medicine for curing all such diseases. Many life saving products are made by biotechnology techniques.

Insulin: Useful for diabetics.

Vaccine: Useful for many infectious disease.

Interferon: Anti viral proteins

(c) Food production

Use of better quality genes in the animals is producing high yields of milk and meat. Vitamin B12, widely used as an additive food and in some medicines is produced in high yielding cultures are bacteria. Production of better quality fruits and vegetables and increase their shelf lives are also due to using biotechnological techniques.

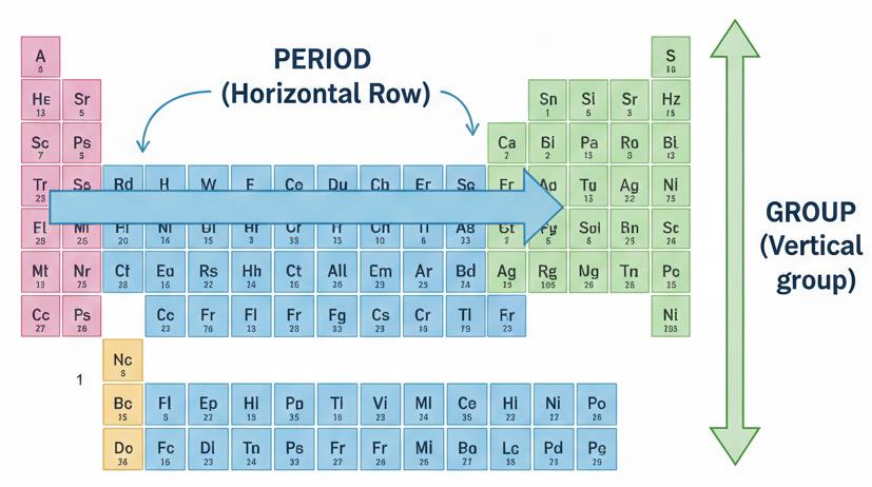
2. Write short answers.

i. What is meant by period in periodic table?

Ans. The horizontal rows in periodic table are called period.

ii. What is meant by group in periodic table?

Ans. The vertical column in periodic table is called group.



iii. Define elements.

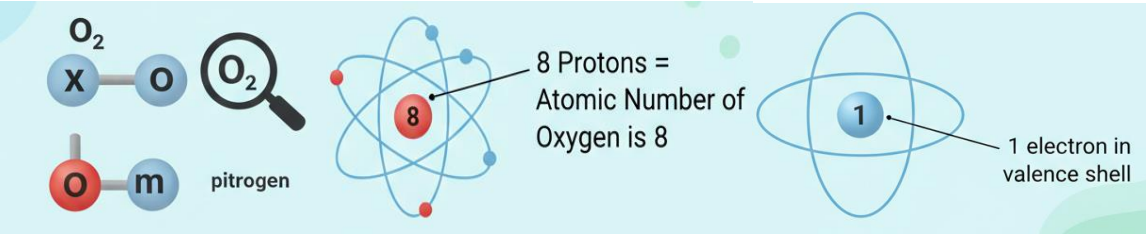
Ans. An element is a pure substance consisting of only one type of atom which all have the same numbers of protons in their nuclei. For example O_2, N_2.

iv. What do you mean by atomic number?

Ans. The number of protons in the nucleus of an atom is called atomic number. For example: atomic number of Oxygen is 8.

v. How many electrons are there in the valence shell of H?

Ans. There is only 1 electron in the valence shell of H.



3. Constructed response questions

(i) Oxygen is a non-metallic element.

(a) What is the atomic number of oxygen? Ans: Atomic number of oxygen is 8.

(b) In which group of the Periodic Table, oxygen is located? Ans: In 16

(c) In which period of the Periodic Table, oxygen is located? Ans: 6A (Note: This answer is likely incorrect, Oxygen is in Period 2. The OCR provided "6A" which typically refers to Group 16/VIA).

(d) How many electrons are required by oxygen atom to complete its valence shell? Ans: 2 electron

(e) State any two uses of oxygen in daily life. Ans: i. For respiration. ii. Burning of coal.

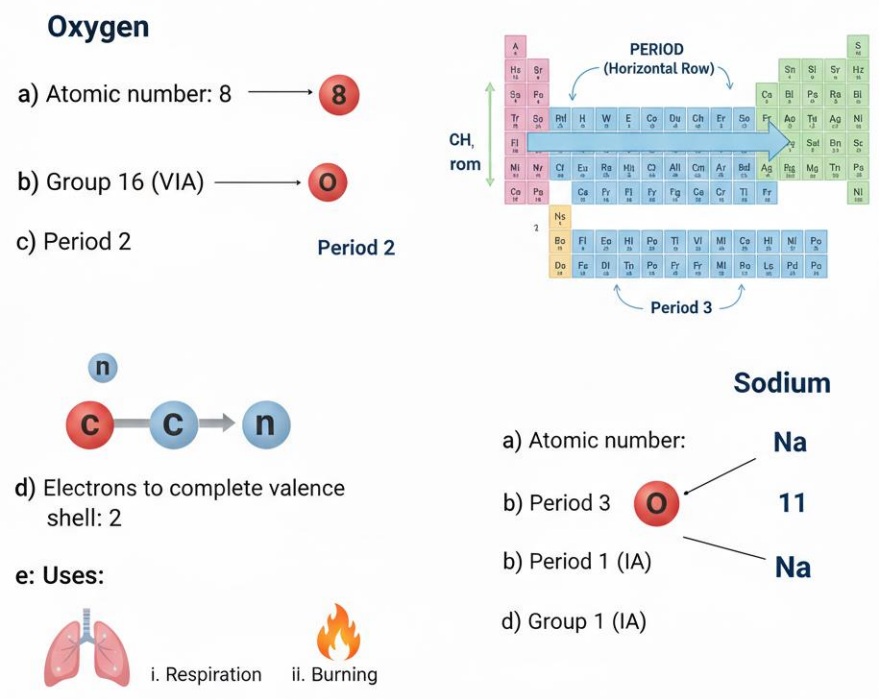
(ii) Sodium is a metallic element.

a) what is the symbol of sodium? Ans. Na

b) what is the atomic number of sodium in periodic table? Ans. 11

c) in which period of the periodic table sodium is located? Ans. 3rd

d) what is the group number of sodium in periodic table? Ans. 1st



3. Name the members of the following families in the periodic table.

a) Alkali metals.

Ans. Hydrogen H, Lithium Li, Sodium Na, Potassium K, Rubidium Rb, Cesium Cs, Francium Fr

b) Alkaline earth metals.

Ans. Beryllium Be, Magnesium Mg, Calcium Ca, Strontium Sr, Barium Ba, Radium Ra.

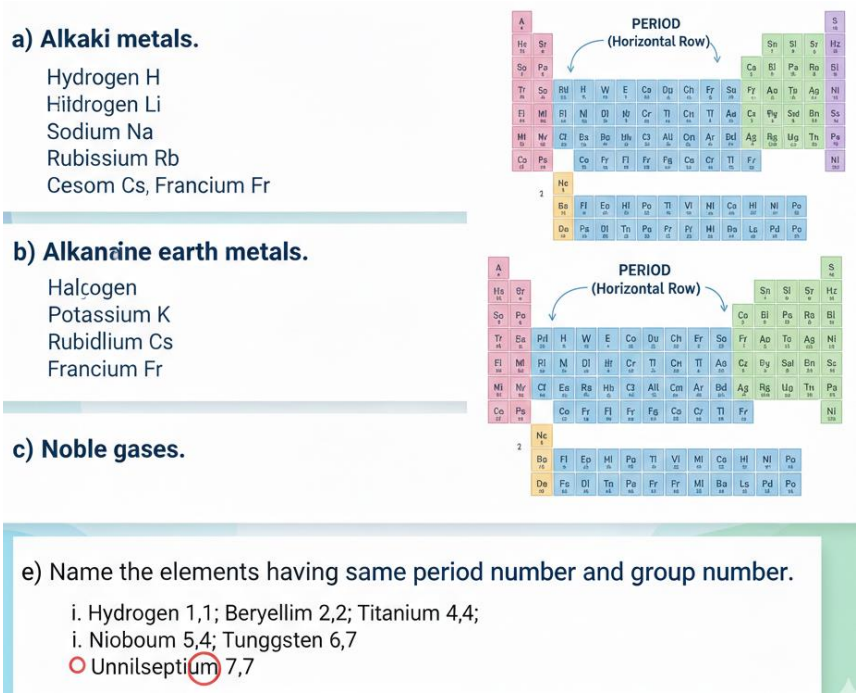
c) Halogens.

Ans. Fluorine F, Chlorine Cl, Bromine Br, Iodine I, Astatine At

d) Noble gasses.

Ans. Helium He, Neon Ne, Argon Ar, Krypton Kr, Xenon Xe, Radon Rn.

e) name the elements having same period number and group number.
Ans. Hydrogen 1,1; Beryllium 2,2; Titanium 4,4; Niobium 5,5; Tungsten 6,6; Unnilseptium 7,7.



4. Relate the following properties of metal with their use in daily life.

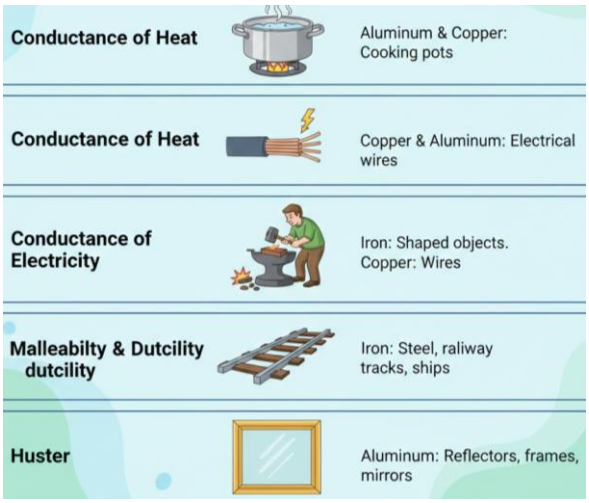
Conductance of heat: Aluminum and copper are used to make cooking pots and pans.

Conductance of electricity: Copper and aluminum are used to make electrical wires.

Malleability and ductility: Iron can be drawn into desirable shape and copper is used in making wires.

Hardness: Iron is used to make steel, railway tracks and ships.

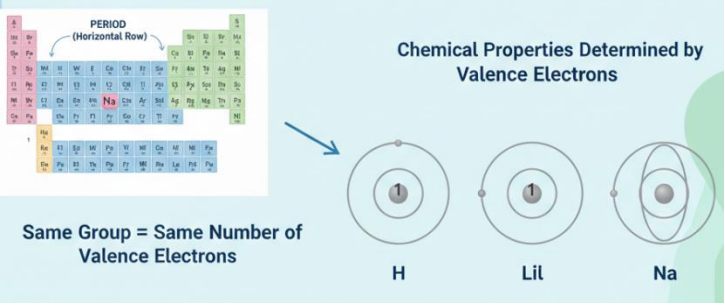
Luster: Aluminum is used to make reflectors of light, picture frame and mirrors.



Question number 4. Investigate.

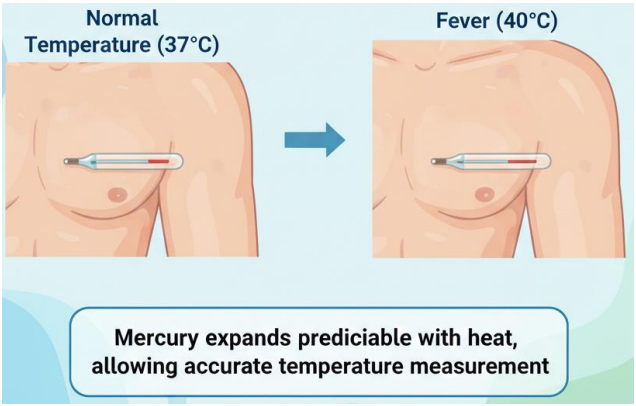
1. Why the chemical properties of the elements present in a group are same?

Ans. Elements are arranged in group having same number of valence shell electron. Chemical properties depends upon number of electrons in valence shell so all elements in same group have same chemical properties.



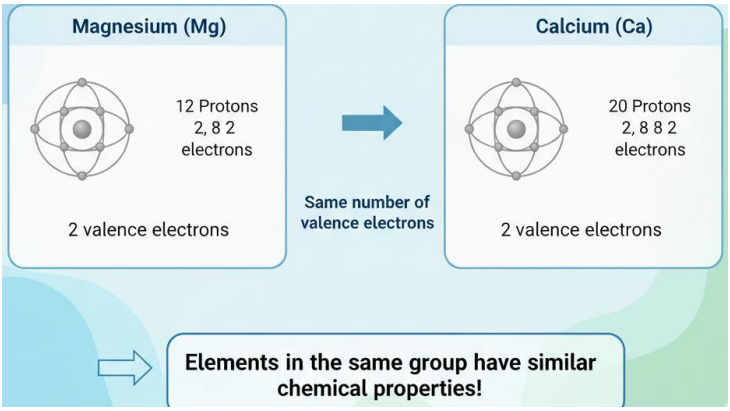
2. Why is Mercury used in thermometer to measure the body temperature?

Ans. Mercury is used to measure Temperature of a body because if temperature of body is increased it shows expansion and the degree of expansion helps us to determine the temperature of body.



3. Magnesium and calcium are kept in the same group of periodic table why?

Ans. Magnesium and calcium both are metals and they have same number of valence shell electrons because of this reason both are placed in same group.



5. Write at least two examples of the following chemical reactions.

(i) Combination reaction (ii) Decomposition reaction

(iii) Exothermic reaction (iv) Endothermic reaction

Ans:

i. The following are two example of combination reaction:

$2H_{2(g)}$ (Hydrogen) + $O_{2(g)}$ (Oxygen) $\longrightarrow$ $2H_2O_{(g)}$ (Water)

$H_{2(g)}$ (Hydrogen) + $Cl_{2(g)}$ (Chlorine) $\longrightarrow$ $2HCl_{(g)}$ (Hydrogen chloride)

Ans:

ii. The following are two example of decomposition reaction:

$2KClO_{3(s)}$ (Potassium chlorate) $\xrightarrow{Heat}$ $2KCl_{(s)}$ (Potassium chloride) + $3O_{2(g)}$ (Oxygen)

$CaCO_{3(s)}$ (Calcium carbonate) $\xrightarrow{Heat}$ $CaO_{(s)}$ (Calcium oxide) + $CO_{2(g)}$ (Carbon dioxide)

5. Write at least two examples of the following chemical reactions.

(i) Combination reaction (ii) Decomposition reaction

(iii) Exothermic reaction (iv) Endothermic reaction

Ans:

i. The following are two example of exothermic reaction:

$C_{(s)}$ (Carbon) + $O_{2(g)}$ (Oxygen) $\longrightarrow$ $CO_{2(g)}$ (Carbon dioxide) + Heat

$CH_{4(g)}$ (Methane) + $2O_{2(g)}$ (Oxygen) $\longrightarrow$ $CO_{2(g)}$ (Carbon dioxide) + $2H_2O_{(g)}$ (Water) + Heat

Ans:

ii. The following are two example of endothermic reaction:

$N_{2(g)}$ (Nitrogen) + $2O_{2(g)}$ (Oxygen) + Heat $\longrightarrow$ $2NO_{2(g)}$ (Nitric oxide)

$H_{2(g)}$ (Hydrogen) + $I_{2(g)}$ (Iodine) + Heat $\longrightarrow$ $2HI_{(g)}$ (Hydrogen iodide)

6. **How do the following reactants react together? Write down complete reacti and balance the resulting equations.**

(i) Iron + Hydrochloric acid

$Fe + 2HCl \longrightarrow FeCl_2 + H_2$

Balance $2Fe + 2HCl \longrightarrow 2FeCl + H_2$

(ii) Calcium oxide + Carbon dioxide

$CaO + CO_2 \longrightarrow CaCO_3$

Balance $CaO + CO_2 \longrightarrow CaCO_3$

(iii) Carbon monoxide + Oxygen

$2CO + O_2 \longrightarrow 2CO_2$

Balance $2CO + O_2 \longrightarrow 2CO_2$

6. **How do the following reactants react together? Write down complete reacti and balance the resulting equations.**

(iv) Methane + Oxygen

$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$

Balance $CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$

(v) Carbon dioxide + Water

$CO_2 + H_2O \longrightarrow CH_4 + O_2$

Balance $6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$

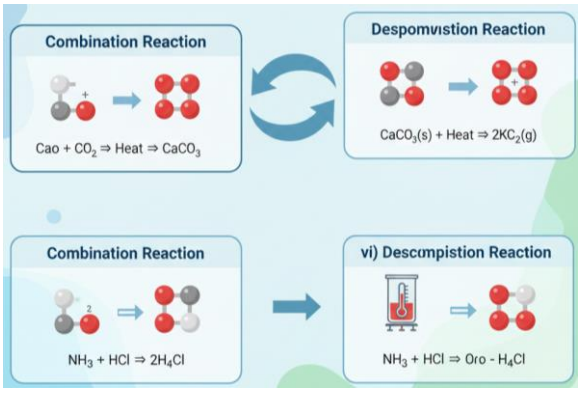
(i) How combination and decomposition reactions are related to each other?

Ans. They are two types of chemical reaction that are related to each other in terms of the changes they bring about in the composition of substances. The relationship lies in their reversibility. Many composition reaction can be thought of as the reverse of decomposition reaction and vice versa.

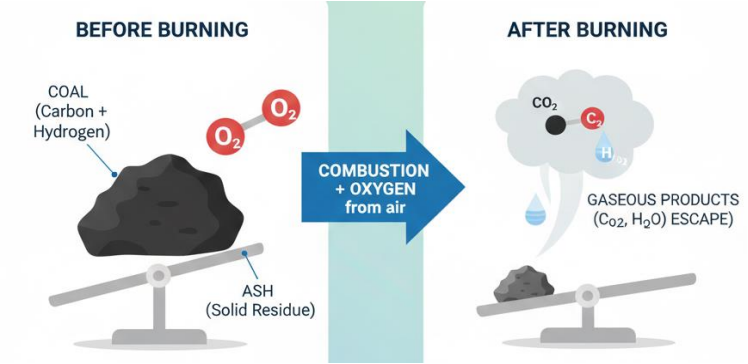
Examples:

$CaO+CO_2 \rightarrow CaCO_3$

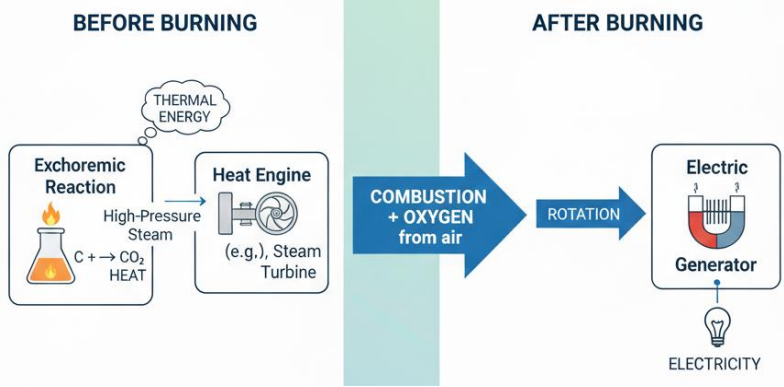
$NH_3+HCl \rightarrow NH_4Cl$


Combination Reaction
Cao + CO2 ⇒ Heat ⇒ CaCO3
Despomvistion Reaction
CaCO3(s) + Heat ⇒ 2KC2(g)
Combination Reaction
NH3 + HCl ⇒ 2H4Cl
vi) Descompistion Reaction
NH3 + HCl ⇒ Oro - H4Cl

(ii) Why the mass of ash obtained when a piece of coal is burnt is less than the mass of coal?
Ans. During combustion, the carbon and hydrogen atoms in the coal react with oxygen in the air to form CO^2 and water vapor. These gaseous products escape into the atmosphere. As a result, the original mass of coal is reduced due to the loss of these elements in the form of gases.

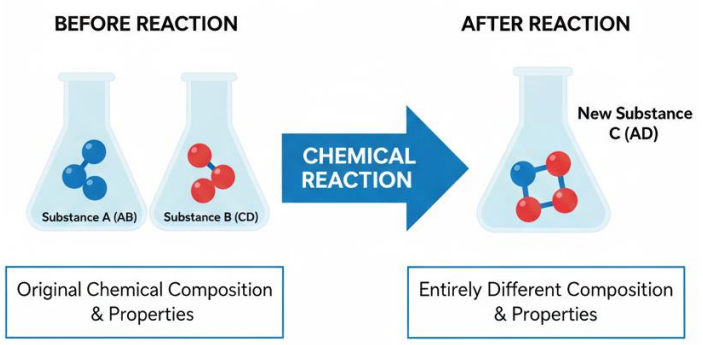


(iii) How electricity is generated with the help of an exothermic reaction?
Ans. Electricity can be generated through exothermic reactions in various ways, with the most common method being through the use of heat engines such as steam turbines or internal combustion turbines. The exothermic reaction provides the thermal energy needed to create high pressure, high temperature conditions which are essential for driving the turbine.



i. Define a chemical reaction.

Ans. The process during which a substance changes into entirely new substance with different chemical composition and properties is called chemical reaction.

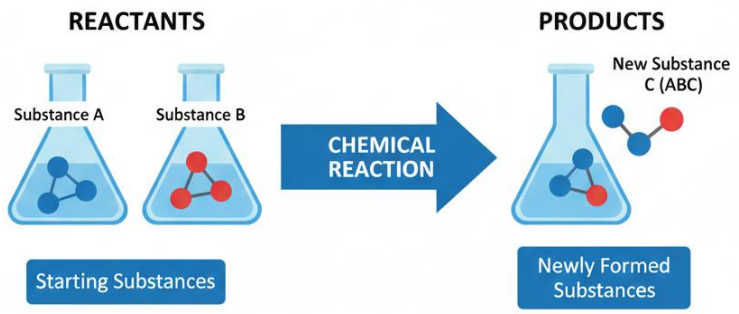


ii. What are reactants?

Ans. The substances which take part in a chemical reaction are called reactants.

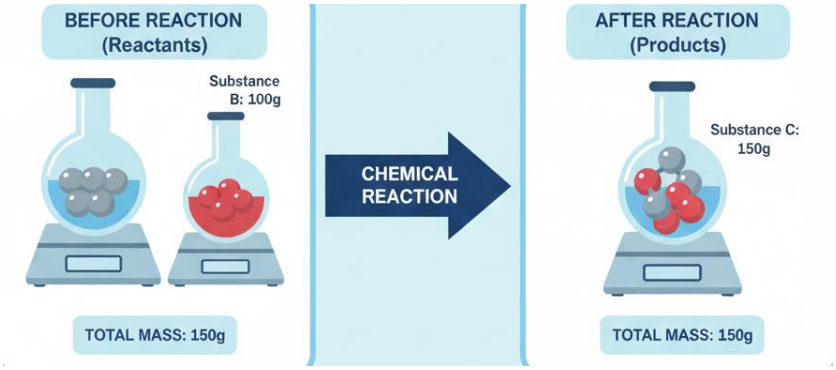
iii. What are products?

Ans. The substances which take part in a chemical reaction are called reactants and those which are formed as a result of the reaction are called products.



iv. State the law of conservation of mass.

Ans. Law of conservation of mass states that during a chemical reaction, mass is neither created nor destroyed but it changes from one form to another. In other words during a chemical reaction, total mass of the products is equal to the total mass of the reactants

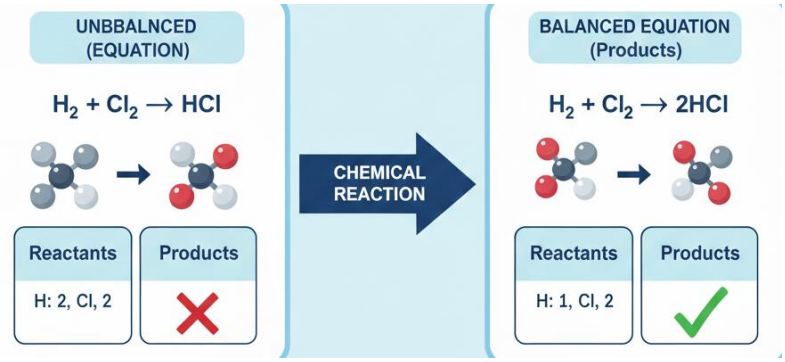


v. Differentiate between

a. Balanced chemical equation and unbalanced chemical equation

Balanced chemical equation: The chemical equation in which the number of atoms of each substance on both sides of the equation, i.e., reactant side and product side are equal is called a balanced chemical equation.

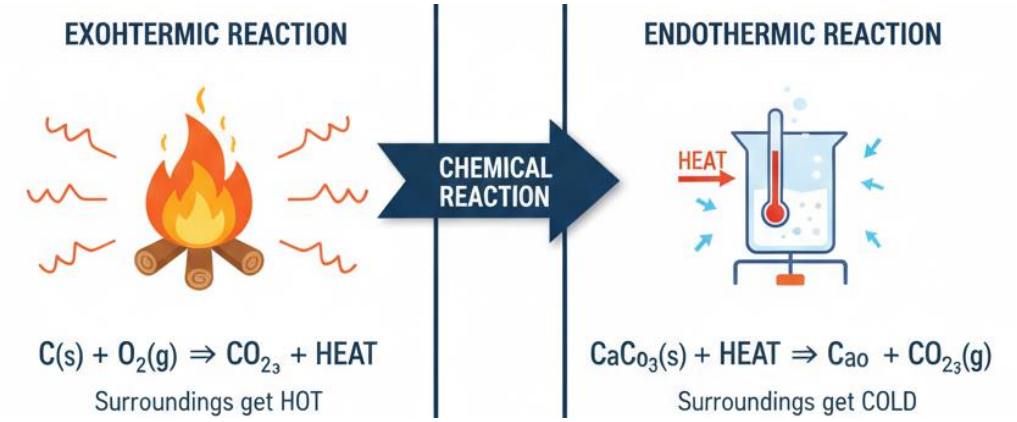
Unbalanced chemical equation: The chemical equation in which the number of atoms of each substance on both sides of the equation, i.e., reactant side and product side is not equal is called an unbalanced chemical equation.



b. Exothermic reactions and Endothermic reactions

Exothermic reactions: Reactions during which heat is released by the substances and surroundings become hot. Burning is a common example.

Endothermic reactions: Reactions during which heat is absorbed by the substances from surroundings. Thermal decomposition of calcium carbonate is an endothermic reaction.



3. Complete and balance the following incomplete equat

(i) $Mg_{(s)} + O_{2(g)} \longrightarrow$

Mg (s) + O_2 (g) → MgO (s)

Balance Equation

2Mg (s) + O_2 (g) → 2MgO (s)

(ii) $CH_{4(g)} + O_{2(g)} \longrightarrow$

CH_4 (g) + 2 O_2 (g) → C O_2 (g) + 2 H_2 O (l)

(iii) $Fe_{(s)} + S_{(s)} \longrightarrow$

Fe (s) + S (s) → FeS

Already balanced

(iv) $N_{2(g)} + H_{2(g)} \longrightarrow$

N_2 + H_2 → N H_3

The balanced chemical equation

N_2 (g) + 3 H_2 (g) → 2N H_3 (g).

(v) $Na_{(s)} + Cl_{2(g)} \longrightarrow$

The balanced equation is

2Na(s)+ Cl_2 (g) → 2NaCl(s)

4. Balance the following equations.

(i) $Ca(HCO_3)_2 + HCl \longrightarrow CaCl_2 + CO_2 + H_2O$

$Ca(HCO_3)_2$ + HCl → $CaCl_2$ + CO_2 + H_2O

The balanced equation is

$Ca(HCO_3)_2$ + 2HCl → $CaCl_2$ + 2CO_2 + 2H_2O

(ii) $NaBr + Cl_2 \longrightarrow NaCl + Br_2$

NaBr + Cl_2 → NaCl + Br_2

The balanced equation is

2NaBr + Cl_2 → 2NaCl + Br_2

(iii) $Fe + O_2 \longrightarrow Fe_2O_3$

$Fe + O_2 \rightarrow Fe_2O_3$

The balanced equation is

$4Fe + 3O_2 \rightarrow 2Fe_2O_3$

(ii) $NaBr + Cl_2 \longrightarrow NaCl + Br_2$

$NH_4OH + H_2SO_4 \rightarrow (NH_4)_2SO_4 + H_2O$

The balanced equation is

$2NH_4OH + H_2SO_4 \rightarrow (NH_4)_2SO_4 + 2H_2O$

(v) $Zn + HCl \longrightarrow ZnCl_2 + H$

$Zn + HCl \rightarrow ZnCl_2 + H$

The balanced equation is

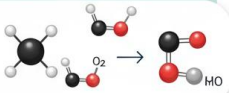
$Zn + 2HCl \rightarrow ZnCl_2 + H_2$

(i) Magnesium + Oxygen →

Balnced Equation: $2Mg\ (s) + O_2\ (g) \Rightarrow 2MGO\ (s)$

(i) $CH_4\ (g) + O_2\ (g)$ →

Balnced Equation: $CH_4\ (s) + 20_22) \Rightarrow CO_2 + 2H_2O\ (l)$

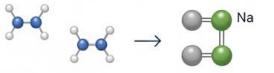


(i) Fe (s) + S (s) →

Balnced Equation: $N_2 + 3H_2\ (s) \Rightarrow 2NH_3\ (g)$

(v) Sodium + Cllorine →

Na (s) + Hydrɾgon: 4 + Cl_2 (s) ⇒ 2NACl (s)



i) $Ca(HCO_{32} + HCL \Rightarrow CaCl_2 + CO_2 + H_2O$

Balncd Equation: $Ca(HCO_1) + 2HCl \Rightarrow 2CO_2 + 2H_2O$

ii) $Nabr + Cl_2 \Rightarrow Nacl + Br_2$

$2Nabr + 2HCl \Rightarrow 2zncal + Br_2$

ii) $Fe + O_2 \Rightarrow Fe_2O3$

$4Fe + 3O_2 \Rightarrow 2Fe + 2O_3$

v) $NH_4OH + H_2SO_0 \Rightarrow (H_4Cl_{12}SO_1) + H_2O$

$2H_4OH + H_2SO_2 \Rightarrow 2HCl \Rightarrow 2CO_2 + 2H_2O$

v) $Zn + HCl \Rightarrow ZnCl_2 + H_2$

$Zn + 22Cl \Rightarrow ZnCl_2 + H_2$

2. Write short answers.

i. Define an acid.

Ans. Acids are defined as the compounds which produce hydrogen ions (H+) in their aqueous solution.

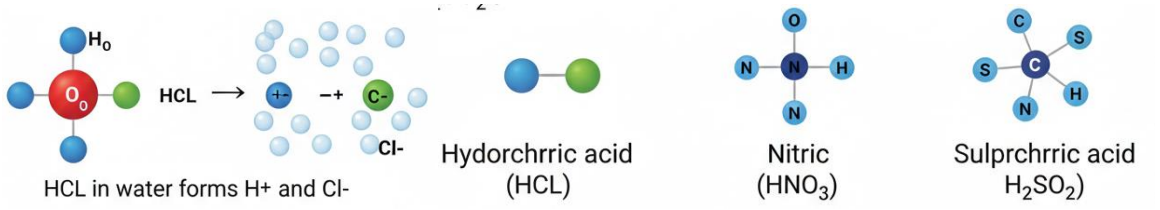
ii. Name three minerals assets

Ans.

Hydrochloric acid (HCl)

Nitric acid (HNO_3)

Sulphuric acid (H_2SO_4)



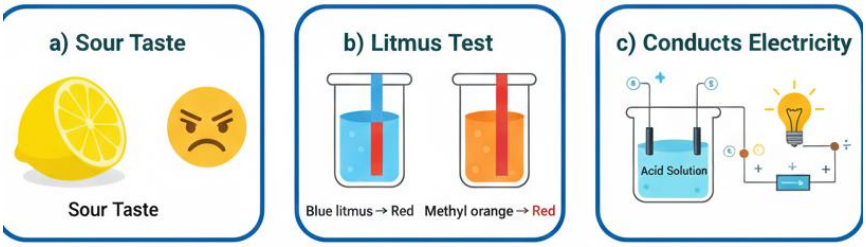
iii. State three properties of acids.

Ans. Properties of acids

a) All acids have a sour taste.

b) All acid turn blue litmus solution and methyl orange solution red.

c) Aqueous solution of acids are good conductor of electricity.

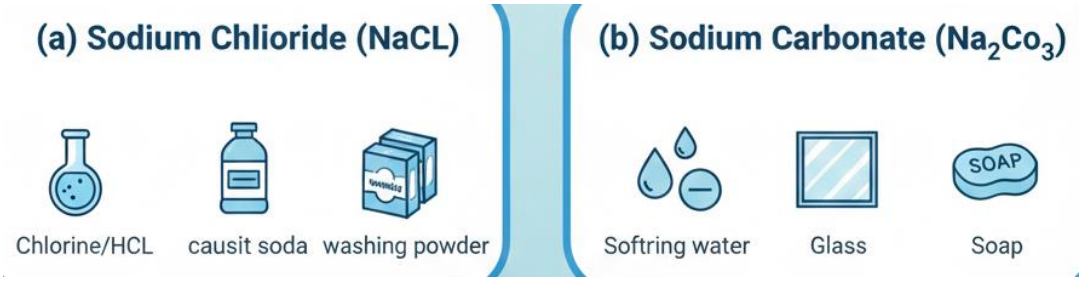


iv. Mention the uses of two salts in industries.

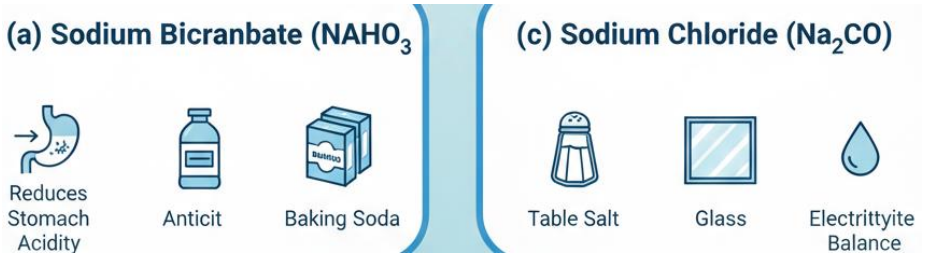
Ans. Uses of salts in industries

(a) **Sodium chloride** is used for the manufacture of chlorine, hydrogen chloride, caustic soda, washing soda and sodium hydrogen carbonate.

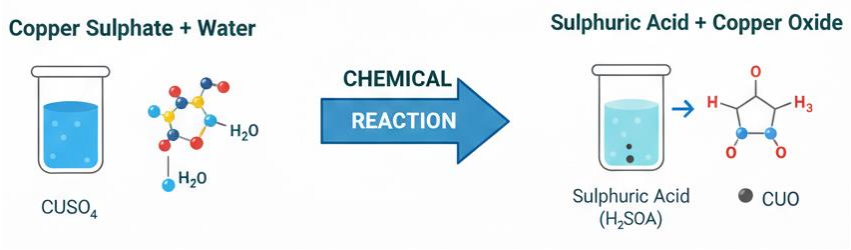
(b) **Sodium carbonate** is used for softening hard water and for the manufacture of glass and soap.



v. Name a salt which can reduce the acidity in our stomach.
Ans. Salt which can reduce the acidity in our stomach are sodium chloride and sodium bicarbonate. (Note: Sodium Bicarbonate is the primary antacid. Sodium Chloride is table salt).



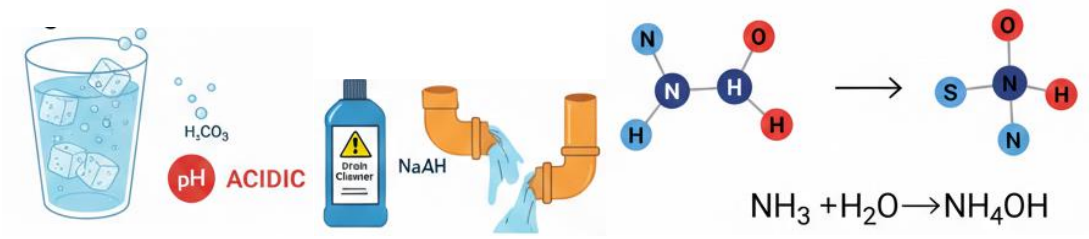
vi. What happens when a salt like copper sulphate reacts with water?
Ans. When sulphate reacts with water then sulphuric acid and copper oxide is formed. (Note: CuSO4 dissolved in water yields an acidic solution due to hydrolysis, but the provided answer suggests a specific reaction.)



vii. Is soda water acidic or basic?
Ans. Soda water is acidic (due to dissolved CO2 forming carbonic acid).

viii. Which alkali is commonly used to open a drain?
Ans. Potassium carbonate strong alkaline is commonly used to open a drain. (Note: Sodium hydroxide (Lye) is more commonly used.)

ix. Write down the chemical equation showing the reaction of ammonia and water.
Ans. $NH_3+H_2O \rightarrow NH_4OH$



x. How is litmus solution prepared?

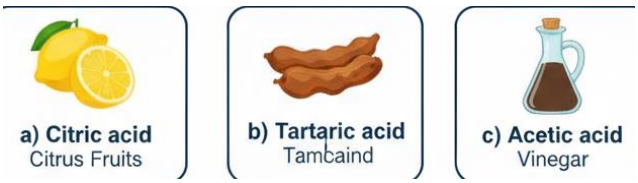
Ans. Litmus solution is prepared by dissolving red cabbage juice or turmeric powder in water. (Note: Litmus is typically extracted from lichens, but red cabbage and turmeric are natural indicators used in labs.)

3. Mention the sources of the following.

a) **Citric acid:** Citrus fruit

b) **Tartaric acid:** Tamarind

c) **Acetic acid:** Vinegar



4. Describe how our salts useful for the human body.

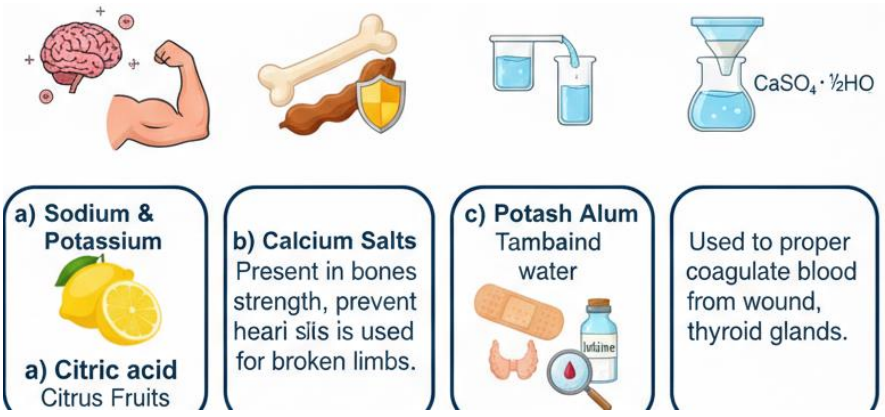
(i) Role of salts in human body

(a) Sodium and potassium salts are needed for the proper functioning of muscles and the nervous system.

(b) Salts of calcium are present in bones. They are responsible for the strength of bones. These salts are responsible for preventing heart attacks. Plaster of Paris (CaSO4·21H2O) is used for broken limbs.

(c) Potash alum is used to coagulate the blood coming out of a wound. It is also used for the purification of water.

(d) Salts of iodine are needed for the proper functioning of thyroid glands.


CaSO4 · ½HO
a) Sodium & Potassium
a) Citric acid
Citrus Fruits
b) Calcium Salts
Present in bones strength, prevent heari slis is used for broken limbs.
c) Potash Alum
Tambaind water
Used to proper coagulate blood from wound, thyroid glands.

5. What happened when:

a) Magnesium reacts with dilute HCl?

Ans. $Mg+2HCl \rightarrow MgCl_2+H_2$

b) Sodium hydrogen carbonate reacts with dilute H2SO4?

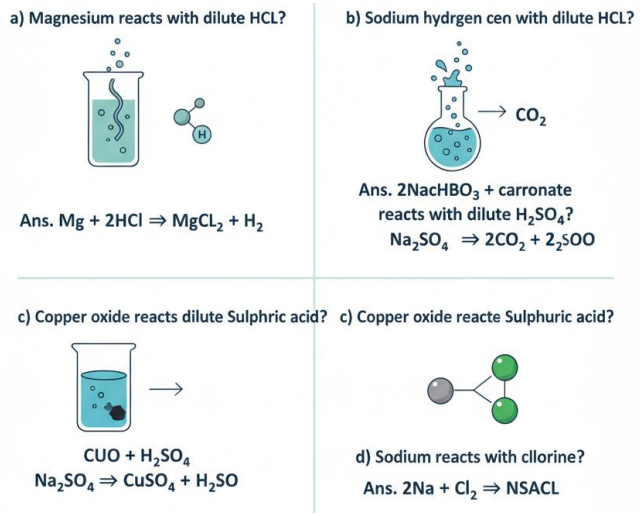
Ans. $2NaHCO_3+H_2SO_4 \rightarrow Na_2SO_4+2CO_2+2H_2O$

c) Copper oxides reacts with dilute Sulphuric acid?

Ans. $CuO+H_2SO_4 \rightarrow CuSO_4+H_2O$

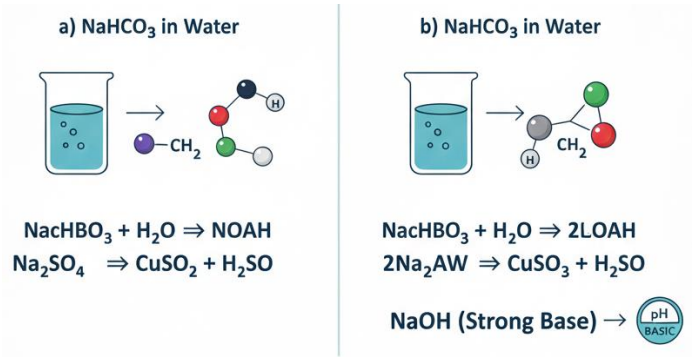
d) Sodium reacts with chlorine?

Ans. $2Na+Cl_2 \rightarrow 2NaCl$


a) Magnesium reacts with dilute HCL?
Ans. Mg + 2HCl ⇒ MgCL2 + H2
b) Sodium hydrgen cen with dilute HCL?
CO2
Ans. 2NacHBO3 + carronate
reacts with dilute H2SO4?
Na2SO4 ⇒ 2CO2 + 2SOO
c) Copper oxide reacts dilute Sulphric acid?
CUO + H2SO4
Na2SO4 ⇒ CuSO4 + H2SO
c) Copper oxide reacte Sulphuric acid?
d) Sodium reacts with cllorine?
Ans. 2Na + Cl2 ⇒ NSACL

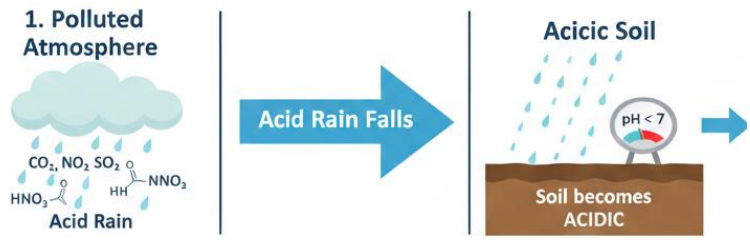
6. Why are the aqueous solution of $NaHCO_3$ and Na_2CO_3 basic in nature?

Ans. When $NaHCO_3$ and Na_2CO_3 are dissolved in water they ionize into sodium (Na) and carbonate CO_2. On the other hand H_2O also splits is Hydrogen (H) and hydroxide ion (OH). When Na and OH combine they form NaOH Due to which solution of $NaHCO_3$ and Na_2CO_3 are basic in nature.



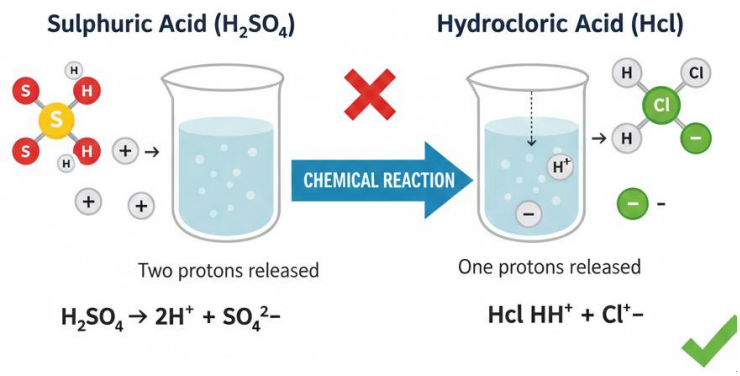
7. How does the soil become acidic?

Ans. When rain water enters in atmospheric regions it mixed with acids like carbonic and Nitric acid due to which it becomes acid. When it reaches the soil it also becomes acidic.



8. Sulphuric acid (H_2SO_4) molecule can give two protons in water whereas hydrochloric acid molecule can give only one proton. Does that mean sulphuric acid is twice as strong acid as hydrochloric acid?

Ans. H_2SO_4 molecule gives two protons (H) in solution, while HCl can only give one proton (H) in solution. As we know, strength of an acids depends upon its ability to give proton (H) in solution that is why H2SO4 is twice stronger than HCl. (Note: This is an oversimplification; strong acid definition is based on complete ionization, and while H_2SO_4 is diprotic, its strength relative to HCl is complex).



9. Indicate in front of each salt the acid and the base which have been used to prepare them.

Name of salt	Acid	Base
Calcium acetate	AA (Acetic Acid)	C.H (Calcium Hydroxide)
Potassium hydrogen sulphate	S.A (Sulphuric Acid)	P.H (Potassium Hydroxide)
Magnesium nitrate	N.A (Nitric Acid)	M.H (Magnesium Hydroxide)
Ammonium oxalate	O.A (Oxalic Acid)	A.H (Ammonium Hydroxide)
Sodium potassium tartarate	T.A (Tartaric Acid)	S.H (Sodium Hydroxide)
Ferric chloride	H.A (Hydrochloric Acid)	F.H (Ferric Hydroxide)

10. Constructed response questions.

(i) Keeping in view the definitions of acids and bases why water is called a neutral compound?

Ans. In water there is a balance between hydrogen ion and hydroxide ion so they cancel each other effect. Pure water is neither acidic nor basic; it is neutral.

(ii) Suppose your garden soil is acidic and you want to grow vegetables which do not grow very well in an acidic soil. How will you make your soil fit for growing vegetables?

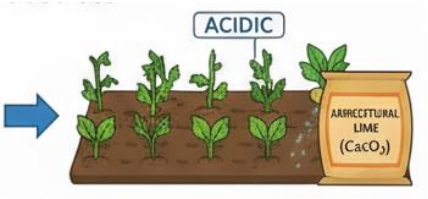
Ans. Soil acidity can be corrected easily by liming the soil, or adding materials (like agricultural lime, CaCO3) to neutralize the acid present.

(iii) Citric acid, tartaric acid and acetic acid are used in food items whereas hydrochloric and sulphuric acid are very dangerous for human health. Give reason.

Ans. Citric acid, tartaric acid and acetic acid are **weak acids**, therefore are used in food items. While hydrochloric acid and sulphuric acid are **strong acids** and are more corrosive therefore are dangerous for human health.

(i) Sodium bicarbonate ($NaHCO_3$) is used as baking soda. Can potassium bicarbonate ($KHCO_3$) be used for baking cakes?

Ans. Baking soda is commonly used for this purpose but potassium bicarbonate is a good alternative in particular if you want to reduce your sodium intake.



(ii) Which common salt of copper is used to kill fungus and algae in plants and trees?

Ans. Copper sulphate is an inorganic compound which is used to kill fungus and algae in plants and trees.

(iii) Why common salt found in Khewra mines is pink in colour?
Ans. Minerals like potassium, magnesium and calcium are also found in pink salt. (Note: The pink color is primarily due to trace minerals, especially iron oxide).

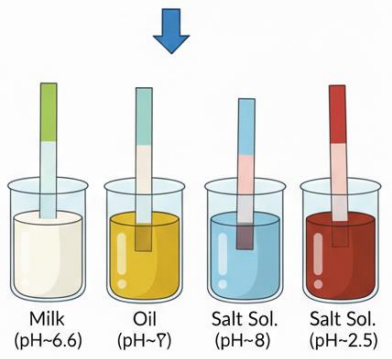
(iv) With the help of pH paper find out the pH following liquids: Milk, cooking oil, common salt solution and vinegar.
Ans.

Milk – 6.4 - 6.8

Cooking oil – 7.38 - 8.63

Common salt – 8

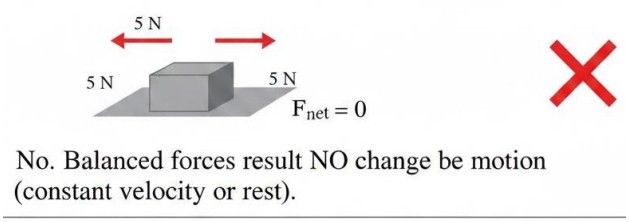
Vinegar – 2-3



Write short answers.

(i) Can a balanced force produce change in motion?

Ans. No, a balanced force cannot produce change in motion. For producing change in motion, an Un-balance force must act on the body.



No. Balanced forces result NO change be motion (constant velocity or rest).

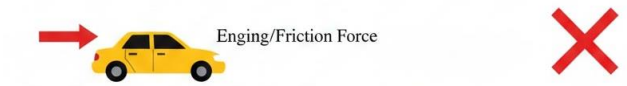
(ii) How can a normal force be balanced?

Ans. A normal force acts perpendicular to the surface of an object. Normal force is balanced by weight of object which acts in opposite direction.

When a equal & opposite force (like acts on it. $F_N = F_G$ on it.

(iii) Does a car slowing down experience a balanced force?

Ans. No. It is experiencing an un-balanced force that is acting in the opposite direction of motion (e.g., braking, friction).

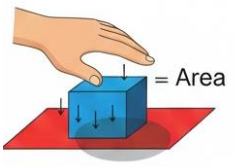


No. Forces are UNBALNCED, causing a deceleration. $F_{net} < 0$

iv) Define pressure.

Ans. Force acting normally per unit area of surface of an object is called pressure.

Formula: Pressure = Force/area

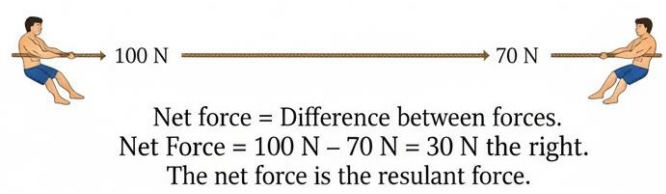


Pressure is defined as the force acting per unit area.

Formula: P = Force / Area.
Unit: PaPascal (Pa)

(v) If two forces act in the opposite directions on an object, what will be the net force acting on it?

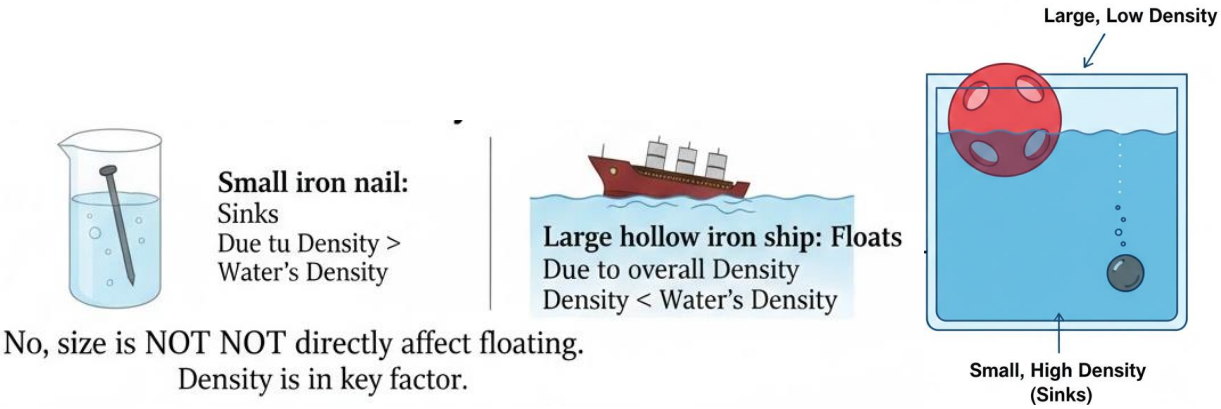
Ans. If two forces act in the opposite directions on an object then the net force will be the difference of force.



3. Constructed response questions.

(i) Does the size of an object affect its ability to float/sinking?

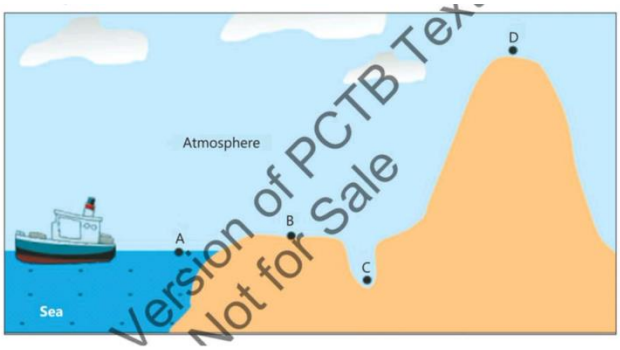
Ans. Yes, the size of an object can affect its ability to float or sink but it's not the only factor. The Buoyancy of an object depends on its density compared to the density of the fluids it's in. If the object average density is less than the density of the fluid it will float. If it's greater it will sink. So, while size can influence this, the object's overall density plays a more significant role.



ii) In the figure shown below, indicate the location where atmospheric pressure is expected to be the lowest.

(Figure shows points A, B, C near sea level/mid-mountain, and D at the peak of a mountain.)

Ans. At position D the atmospheric pressure is expected to be the lowest.



Ans: At position D the atmospheric pressure is expected to be the lowest.

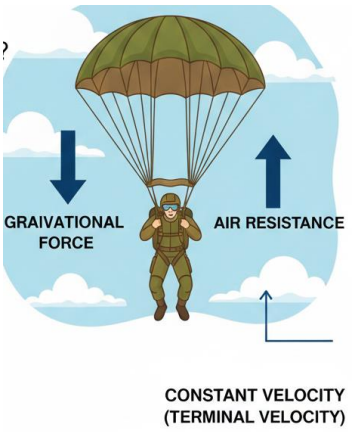
(iii) Sketch the forces acting on a paratrooper. Are these forces balanced or unbalanced?

(Image of a paratrooper is shown.)

Ans. Force of gravity is downward and force of air resistance or drag force is upward so it will be balanced if they are equal (terminal velocity).

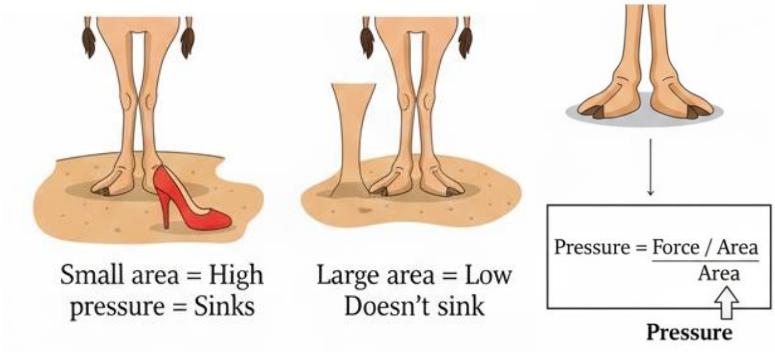
iv) If the forces acting on the paratrooper are balanced forces, how does the paratrooper then fall down?

Ans. If the forces acting on a paratrooper are balanced it means that the gravitational force pulling the paratroopers downward is equal to the earth's resistance. In this state of balance the paratrooper's descent will not accelerate further but they will continue to fall at a **constant velocity** known as the terminal velocity.



(V) Describe how does a bulky camel easily travel in deserts.

Ans. Camels are well-suited to travel easily in desert due to their unique adaptations such as, water storage, energy efficiency, long legs, large feet, insulating coat, strong nose and heavy load-carrying capacity.



2. Write short answers.

i. Write the difference between (a) transmission and absorption. (b) reflection and refraction.

Ans. (a) transmission and absorption

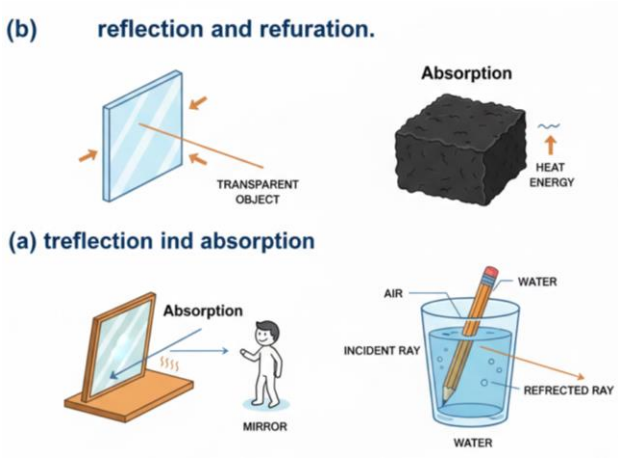
Transmission: When a light falls on transparent objects such as air, water or glass. e.g. it passes through them unchanged. This is called transmission of light.

Absorption: When light is absorbed by the medium and converted it into other forms of energy (like heat).

(b) reflection and refraction.

Reflection: Bouncing back of light after striking the boundary of a medium is called reflection of light. e.g. We see our image in mirror due to reflection of light.

Refraction: The change in direction of light as it passes from one medium to another medium is called a refraction of light e.g. bending of pencil in glass of water is due to reflection (should be refraction).

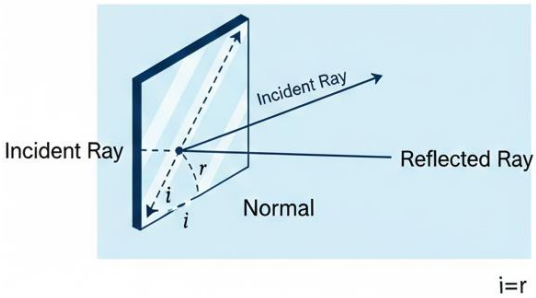


ii. State the laws of reflection.

Ans. There are two laws.

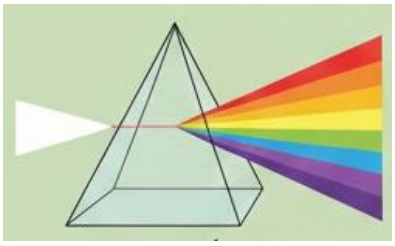
i. The angle of incidence is equal to angle of reflection such that i=r.

ii. The angle of incidence, angle of reflection and normal all lie in the same plane.



i=r

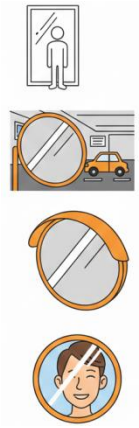
iii. What is the dispersion of white light? What is the cause of such dispersion?
Ans. Dispersion of white light: The splitting of white light into its components colors is called dispersion of light. It is seen in a rainbow.
Causes: The cause of such dispersion is the fact that different colors of light have different wavelengths. When white light passes through a prism, the different colors of light are refracted by different amounts causing them to bend at different angles which spread them into constituent colors.



iv. Name the process which is involved in the formation of a rainbow. Which two conditions are necessary for the formation of rainbow?
Ans. The processes involved in the formation of rainbow are dispersion and total internal reflection.
Conditions:
i. Sunlight must be shining on falling raindrops.
ii. The observer must be in a position to view the light at an angle of 42∘ in a direction opposite to the sun.

v. Describe applications and uses of spherical mirrors in daily life.
Ans. Uses of Spherical Mirror.
i. **Concave mirrors** are used as shaving mirrors or makeup mirrors.
ii. **Concave mirrors** are used by the dentist to examine the teeth of the patient.
iii. **Convex mirrors** are used as rear-view mirrors in vehicles to see the traffic behind for safe driving.
iv. **Convex mirrors** are used as security mirrors in shops.
v. **Convex mirrors** are used as blind corner mirrors on the roads to help the drivers view traffic around the sharp corners.

vi. Give examples of refraction in daily life.
Ans.
i. Twinkling of star.
ii. Seeing a fish underwater (appearing closer).



vii. Name three types of mirrors about which you have studied, and state the characteristics of the image formed in each one of them.

Ans. Mirrors and their characteristics.

i. **Plain mirror:** a) The image is virtual (not real) b) The image is upright (straight)

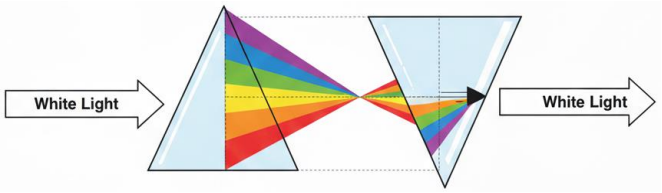
ii. **Convex mirror:** The convex mirror always produces a virtual, upright and smaller image of the object at any distance in front of it. The image is located behind the mirror.

iii. **Concave mirror:** a) The image is real, smaller and upside down (inverted) when the object is far away. b) If the object is very near to the concave mirror the image is virtual, upright and bigger in size (behind the mirror).

3. Constructed response questions.

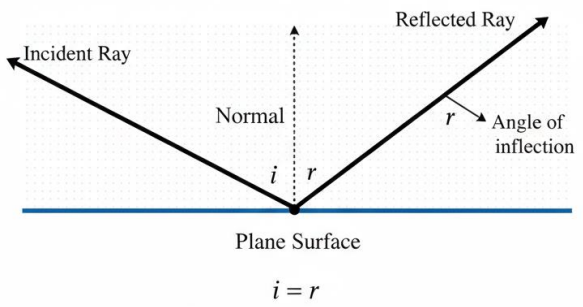
i. How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light?

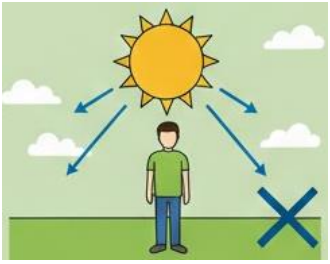
Ans. When two identical prisms are placed in such a way that one is placed inverted with respect to the other and a narrow beam of white light is incident on one, it emerges out of the second prism as white light. Angle of deflections of the two prisms are equal and opposite. While the first prism splits the light in the seven colors, the second prism combines the spectrum along a single ray and the colors again combine to give white light as the emergent light.



ii. Explain the phenomenon taking into consideration that the angle of incidence is equal to the angle of reflection.

Ans. The angle of incidence is equal to the angle of reflection because the light ray selects the shortest path to reach the destination. This behavior of light is known as Fermat's principle. The same behavior is shown by the light ray when it gets reflected from the plane surface.



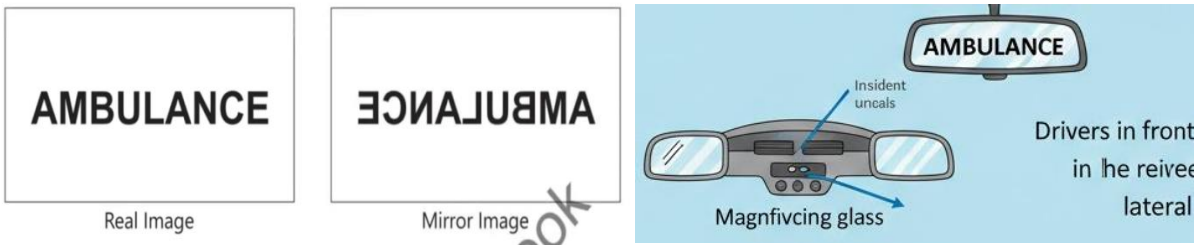


iii. Why the rainbow is not seen at noon even there is Sun in the sky and moisture in the air?

Ans. A rainbow is located opposite to the sun; this explains why rainbows are not seen at noon with the sun overhead. There needs to be a clear path from the sun to the rain falling from the cloud. If the sun is Overhead and raining, you are probably standing in the rain with the cloud obscuring the sun.

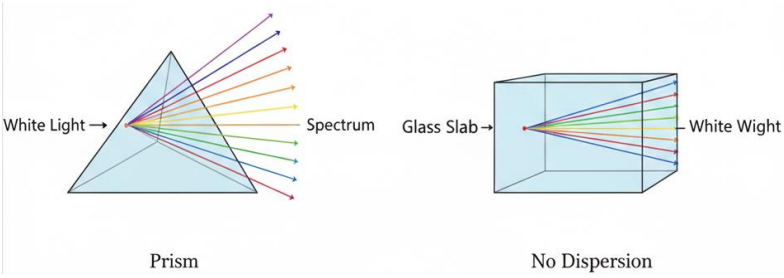
(iv) On vehicles the word "AMBULANCE" is written in the form of mirror image. Explain the reason.

Ans. It is written like this in front of an ambulance because when the people driving in other cars look in their rear view mirror they see the "AMBULANCE" written correctly (due to lateral inversion property of the plane mirror). It helps the driver to know that the Ambulance is coming so he should provide some space.



(v) Why dispersion can take place from prism but not through a glass slab?

Ans. Dispersion occurs when light is passed through a prism. The dispersion is caused due to the difference in the angle of deviation for different colors. In the case of a glass slab, the opposite sides are parallel and therefore different colors emerge parallel to each other and are seen simultaneously, recombining the white light.



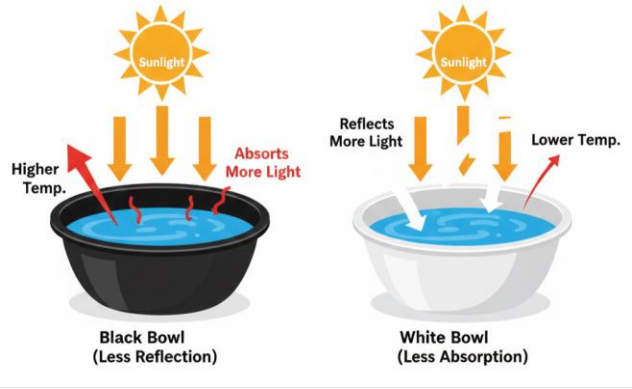
(vi) What does make the black words written in a book visible to you?

Ans. Contrast is more important in lightness and color, it just so happens that black and white is the highest contrast. Greater differences in the lightness and the color of text and background is optimum for reading ability.

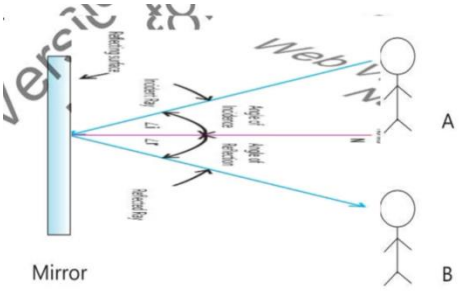
4. Investigate

i. Place a black plastic bowl and a white plastic bowl containing the same amount of water in the sunlight... Which bowl absorbs more light and which bowl reflects less light?

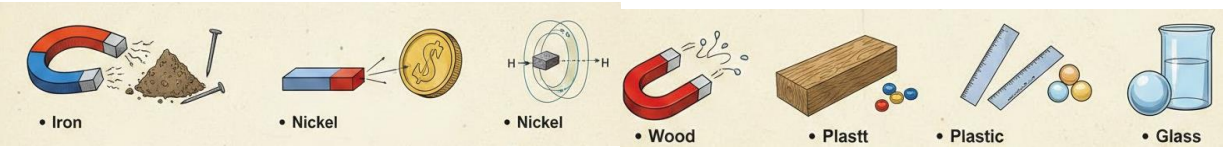
Ans. The darker the object, the better it emits heat, because it's a better absorber of light. So, if we place a black plastic bowl and a white plastic bowl containing the same amount of water in the sunlight then black plastic bowl will absorbs more light and the temperature of it will be greater. White color reflects more and black colored object reflects less light.



(ii) A and B are two bodies facing the mirror. They are standing in such a way that A can see B and B can see A. Explain the phenomenon. Make a ray diagram.
Ans. (Description of the ray diagram, indicating that light follows the law of reflection: light travels from A, reflects off the mirror, and reaches B; and vice versa).

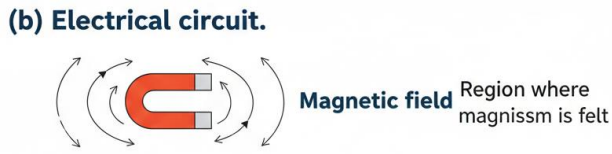


2. Write short answers.
i. Give three examples of the followings:
(a) magnetic materials. Examples: Iron, Nickel, Cobalt
(b) non-magnetic materials Examples: Plastic, Rubber, Leather.



ii. Define the following:
(a) Electric current. Ans: Flow of charge is called electric current. The SI unit for electric current is ampere.

(b) Electrical circuit. Ans: The path along which electric charge flows is called electric circuit.



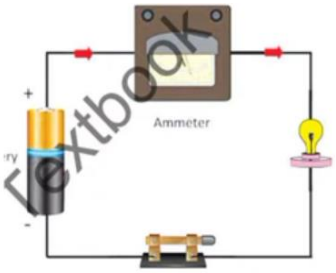
(c) Magnetic field. Ans: The magnetic field is the region or area around a magnet in which the effect of magnetism is felt.

(d) Electromagnet. Ans: An electromagnet is a temporary magnet which behaves like a magnet when an electric current is passed through the insulated copper wire and loses its magnetism when current is stopped. It has a soft iron piece called the core with an insulated copper wire wound on it.

iii. Describe with the help of diagram.

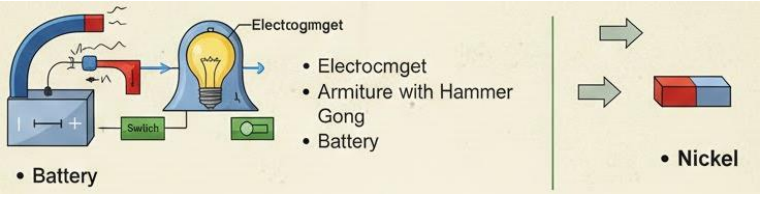
(a) Closed circuit. Ans: Closed circuit means a complete electrical connection around which current flows or circulates.

(b) Open circuit. Ans: A circuit in which the continuity is broken due to which the electric current can not flow is known as the open circuit.



iv. What is the basic working principle.

(a) Electric bell. Ans: Electric bell works on magnetic effect of electric current. The electromagnet attracts the soft iron armature. when the striker hits the gong it produces sound.

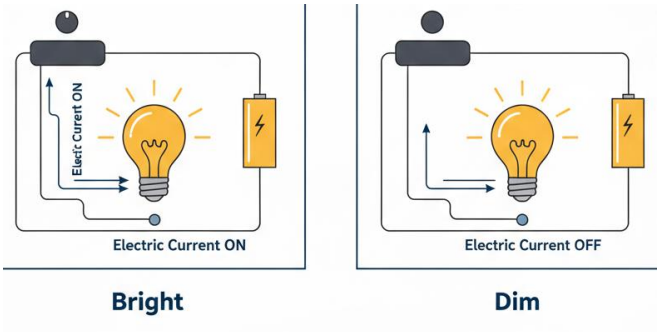


(b) Loud speaker. Ans: Loud speakers work by converting electrical energy to mechanical energy (motion). The mechanical energy compresses air and converts the motion into sound energy.

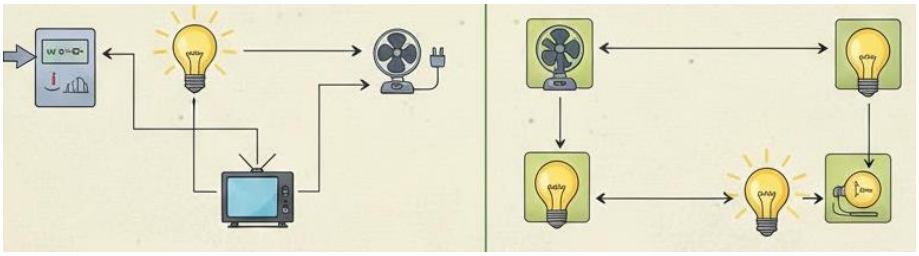
v. Give three examples of electromagnetic device in daily life.
Ans. Generator, motors and transformers. Headphones and loud speakers, Data storage devices like VCRs, tape recorders, hard drives, etc.

3. Constructed response questions.
i. What is electric switch? How it causes an electric circuit? (a) Open. (b) Close.
Ans. Electric Switch: An electric switch is an electrical component that breaks or closes an electric circuit.
(a) Open circuit: When switches are open, there is a gap in the circuit and electric charge cannot flow, then the circuit is not working.
(b) Close circuit: When switches are closed, there is no gap in the circuit and electric charge can flow, then the circuit is working.

ii. How can a dimmer switch make the same light bulb appear dim or bright?
Ans. The dimmer switch works by simply cutting the amount of electricity that is flowing through the circuit into the lights. That means it is sending less current to your lights.



iii. Which type of electric circuit is used in our home supply? Series circuit or parallel circuit and the reasons of your choice.
Ans. Parallel circuit is used in our home supply because in parallel circuit all appliances get the full main voltage and one can turn ON or OFF any appliance without having to turn ON or OFF another.

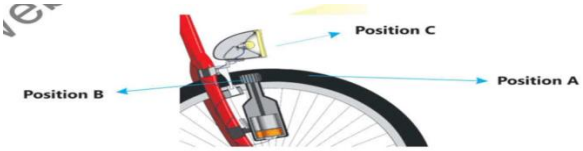


(iv) Look at the picture and answer the questions given below: (Picture of a bicycle dynamo)

At position A (Pedals/Rider), mechanical energy (kinetic energy) is produced, which comes from chemical energy of human body.

At position B (Wheel), rotational energy is produced, which comes from the wheel of the bicycle attached with dynamo.

At position C (Light), electrical energy is produced, which comes from the magnetic field produced inside the dynamo.



v. Which of the following will pick more paper clips when an electric current pass through wire?
(a) A coil of wire with 20 turns or a coil of wire with 50 turns. Ans: A coil of wire with 50 turns will pick more paper clips.
(b) Wire wound around a wooden stick or a wire wound around an iron nail. Ans: A wire wound around an iron nail will pick more paper clips.

4. Investigate
A student has two metal bars. He/She knows that metal bar 1 is a magnet.
1. How could he/she use metal bar 1 to find out if metal bar 2 is a magnet?
Ans. Bring both metal bars near to each other with their poles. If both bars attract as well as repel each other, the metal bar 2 is also a magnet. Otherwise metal bar 2 is not a magnet. (Repulsion is the sure test for magnetism).
2. What would he/she observe if metal bar 2 is a magnet?
Ans. If metal bar-2 is a magnet, then its poles will attract as well as repel each other when brought near the poles of metal bar 1.

2. Write short answers.

i. What does UPS stands for?

Ans. It stands for Un-interrupted Power Supply.

ii. Which of the plastic and bio-plastic is environmental friendly?

Ans. Bio-plastic is considered to be more environmental friendly because it is made from renewable resources such as sugarcane and can biodegrade more easily.

iii. What is the role of glycerol making bio plastic from starch?

Ans. Glycerol plays a crucial role in the making of bioplastic. It is used as a plasticizer, which helps to increase the flexibility and durability of the bioplastic.

iv. Which energy is converted into electricity by a wind turbine.

Ans. Wind energy (kinetic energy) is converted into electricity by wind turbine.

v. What is concave mirror?

Ans. A mirror whose inner curved surface is reflecting is called concave mirror. It is used in reflecting Telescopes, headlights and makeup mirrors.

vi. What is the difference between soap and detergents?

Ans. Soap is made from fats and oil while detergents are made from synthetic materials. Soap is biodegradable and has less impact on environment while detergents may be more effective at cleaning and are often used in industrial applications.

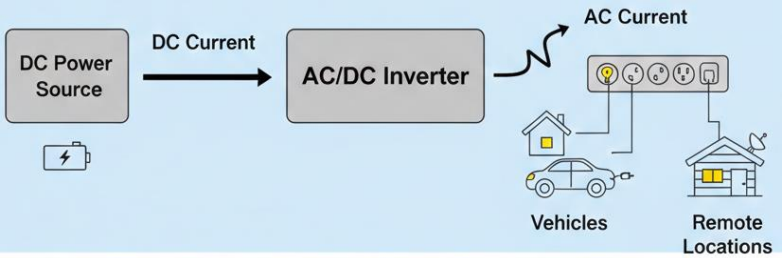
vii. How bio plastic is good for healthy environment?

Ans. Bio plastic is good for healthy environment because they are made from renewable resources such as plants and they biodegrade easily. This can help to reduce the amount of plastic waste in the environment.

3. Constructed response questions.

i. What is AC/DC invertor? Describe its importance.

Ans. It is an electronic device that converts direct current (DC) into alternating current (AC). It is used where AC Power sources are not available. Invertors are used in homes, vehicles and remote locations.



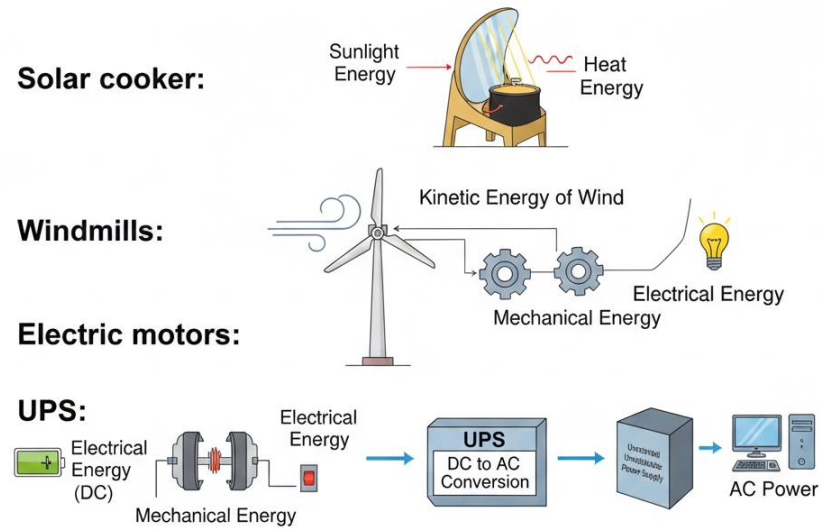
ii. State the energy conversion in solar cooker, windmills, electric motor and UPS?
Ans.

Solar cooker: Convert sunlight energy to heat energy.

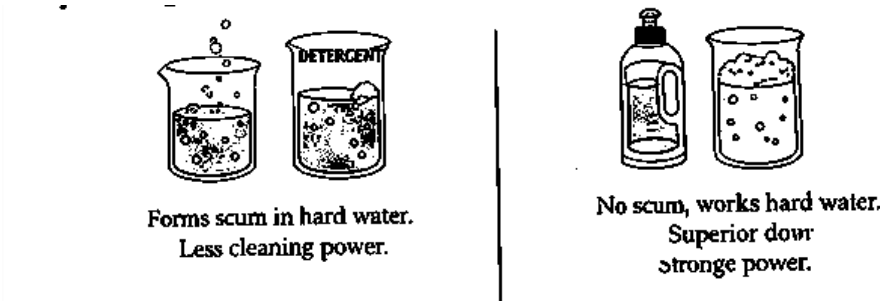
Windmills: Convert kinetic energy of wind to mechanical energy which is then converted to Electrical energy.

Electric motors: Convert electrical energy to mechanical energy.

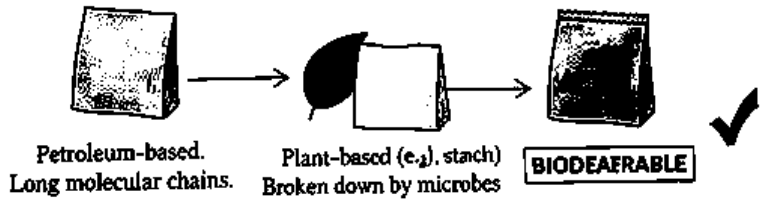
UPS: Converts electrical energy stored in the batteries (DC) to alternating current (AC) power.



iii. Why are detergents considered as more useful than soaps in everyday life?
Ans. It is because they are more effective in removing dirt and stains. They can be used in hard water. They are more versatile in their application.



iv. Why is an ordinary plastic bag not biodegradable but bio plastic is biodegradable?
Ans. Ordinary plastic bag is not biodegradable because it is made from petroleum based materials that do not break down easily in the environment, while bio plastic is biodegradable because it is made from plant based materials that can decompose naturally.



i. The advantages and disadvantages of UPS technology?
Ans. Advantages:

Provide temporary power during electrical outages.

Protect equipment from power surges, sags and spikes.

Help prevent data loss and equipment damage.
Disadvantages:

Limited battery life and capacity.

Can be expensive to maintain and purchase.

Can generate heat and noise.

ii. Which other naturally occurring material apart from starch and banana you will use to prepare bioplastic?
(No direct answer provided in OCR, but likely refers to other plant sources like cellulose or proteins).

iii. Which detergent is used in dry cleaning of woolen clothes?
Ans. Perchloroethylene (also known as perc) which is chlorinated hydrocarbon solvent is used in dry cleaning. It has ability to dissolve oil, grease and other organic compounds.

2. Write short answers.

i. What is a galaxy? What are its main types?

Ans. A galaxy is a massive system of stars, gas, dust and other matters bounded together by gravity.

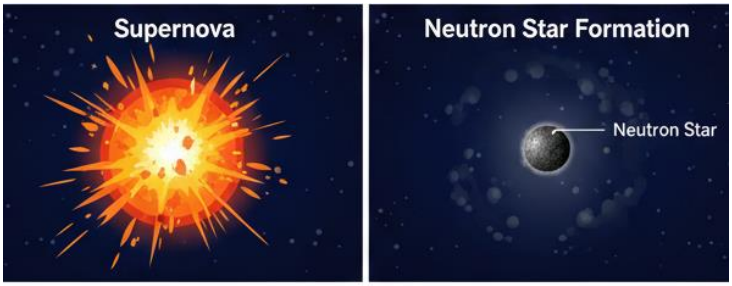
Types of galaxy: i. Spiral galaxy. ii. Elliptical galaxy. iii. Jellyfish galaxy. iv. Irregular galaxy.

ii. Describe the birth and death of a star.

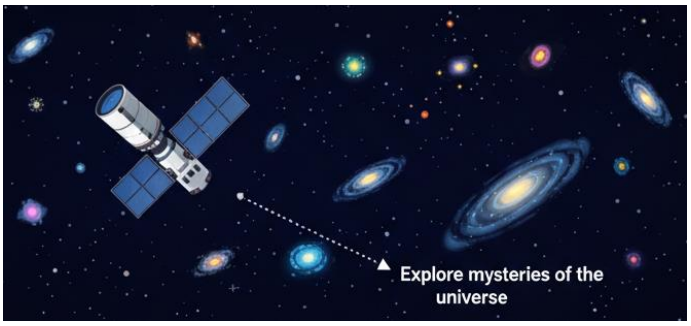
Ans. Stars are born from the collapse of gas and dust in interstellar clouds. They die by exploding as a supernova and leaving behind a neutron star or black hole.

iii. Describe the formation of a neutron star.

Ans. Neutron star is formed from the collapsed core of massive star that has undergone supernova explosion. It is extremely dense usually of diameter 10 kilometer to 16 kilometers and composed of almost all neutrons. Their mass is almost equal to mass of our sun.



iv. What is the advantage of putting telescope in space?
Ans. Advantage of telescope in space: Telescope is expected to explore and discover mysteries from far off places of our universe by sending marvelous images even including neutron stars



v. What does GPS stand for?
Ans. It stands for Global Positioning System.

vi. What is the device that make far away objects appear closer to see its detail?
Ans. Telescope is a device that make far away objects closer to see the details.

vii. Describe the various benefits generated by technology of space exploration.
Ans. Benefits of space exploration
a) Improving health care
b) Global navigation
c) Weather forecast and prediction of natural calamities
d) Advanced electronics and computers
e) Locating minerals fossil fuels and water reserves

viii. What is a space probe? Names at least two space probes.
Ans. It is the spacecraft which are exploring space for more than 50 years. Some of them are as follows: a) Galileo b) Voyager c) Pioneer-10

ix. What is the main differences between an optical telescope and a radio telescope?
Ans. A radio telescope is designed to detect radio waves from distant sources, while an optical telescope is designed to detect visible light.

Optical Telecope

Radio Telecope

x. What is space station? Write its benefits.
Ans. Large space stations have been built in the space. Each space station consists of two main sections: (a) Pressurized section in which scientists work without space suits. (b) Open-to-Space section on which equipment is mounted for observing the Earth and sky.
Benefits.

Producing the next generation of medical scanning technology

Robotic arm technology applications in an automotive factory

Student research in space

Lowering heat in cities and tracking water

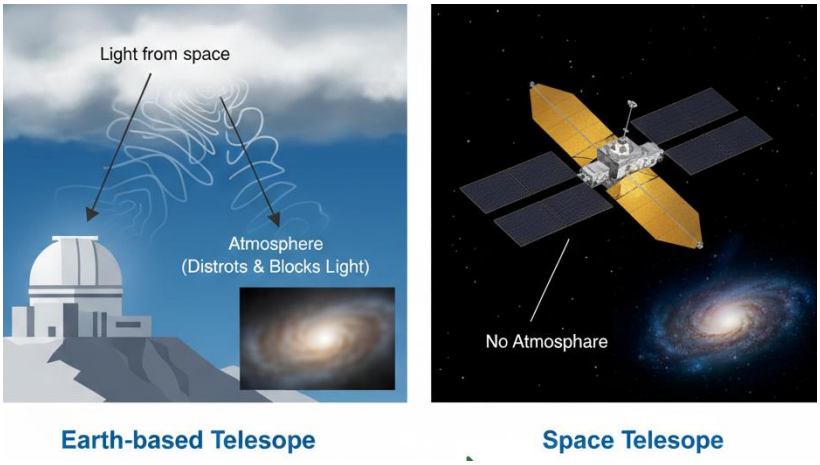
Making cancer treatments simpler for patients

xi. What is a black hole Can it be seen?
Ans. A black hole is a region of space where light cannot escape due to strong gravitational pull. It is the last stage in the life of my massive stars. It cannot be seen directly. It is detected indirectly by the gravity.

3. Constructed response questions.

i. What are advantages of space telescopes such as Hubble and James Webb over the giant telescopes on the Earth's surface.

Ans. Earth's atmosphere can distort and block light which can make it difficult for telescopes to get clear image of objects in space. So it would have a better view of the universe.



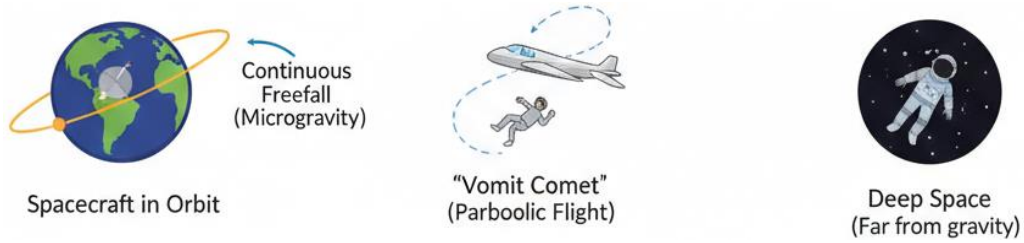
ii. What are the problem's faced by the Astronauts on space missions? How do they overcome these problems?

Ans. Problems faced by the Astronauts: These include space radiation, isolation and confinement, distance from Earth, gravity (and the lack of it), and closed or hostile environments.

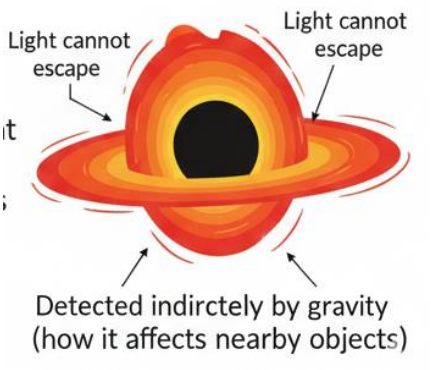
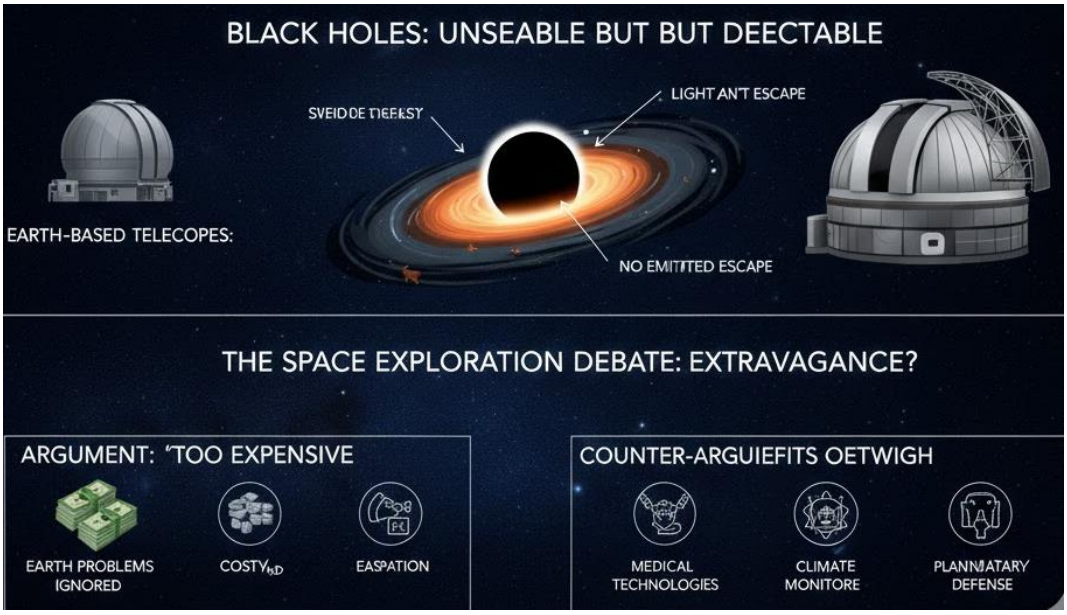
To overcome these problems: Pharmaceuticals help defend against radiation. To overcome isolation, monitoring behavioral health. When astronauts finally return home they will need to readapt many of the systems in their bodies to Earth's gravity.

iii. What is gravity free environment? How can it be achieved?

Ans. Gravity-free space refers to an environment where the effects of gravity are absent or significantly reduced. (Note: The OCR adds a note that "Gravity free environment is not possible," indicating a real-world scientific perspective despite the question).



iv. Why cannot we see the heavenly object "black hole" directly by any telescope?
Ans. Black holes usually cannot be observed directly on account of both their small size and they emit no light.



v. Comment one public opinion that; "Huge spending on space exploration is extravagance".
Ans. Most people who love space and believe in exploration have probably heard this once or twice: "We shouldn't waste money on space exploration when there are problems to deal with here on Earth." While public health concerns, social injustices, climate change, and other urgent issues are important to address, solving these problems doesn't depend on defunding space programs.